2008 Commonwealth of Virginia Technical Plan Blueprint

September 2008

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Executive Summary

The *2008 Commonwealth of Virginia Strategic Plan for Statewide Communications Interoperability* (Statewide Plan) continues to be the overarching strategic guide for efforts to improve interoperability across Virginia. The Statewide Plan describes the high level vision, goals and objectives of the Commonwealth and serves as a unifying platform for all stakeholders. Through the statewide planning process, the Commonwealth declared a vision that states:

> "By 2015, agencies and their representatives at the local, regional, state, and federal levels will be able to communicate using compatible systems, in real time, across disciplines and jurisdictions, to respond more effectively during day-to-day operations and major emergency situations."

To support that vision, the Commonwealth Interoperability Coordinator's Office (CICO) and State Interoperability Executive Committee (SIEC) began a process of implementing the statewide plan. A first step in the Commonwealth's Strategic approach was the creation of the *Commonwealth of Virginia's Operations Model* (Version 1) (Ops Model). The Ops Model provides additional detail to the Statewide Plan by defining "Where do we want to be?" through three sets of descriptive future state capabilities (voice, data and supporting functions). The next step in the implementation process is the development of the Commonwealth's Technical Plan, which will define what Virginia is doing to achieve the future state capabilities defined in the Ops Model. Once the Technical Plan is developed, the last step of the strategic planning process is the creation of a statewide tactical Communications Plan. The intent behind the Communications Plan is to develop regional or locally-focused tactical plans for how each community will interconnect with its primary mutual aid partners and how they will support each other and share resources. These tactical interoperable communications plans will be compiled into a statewide plan as a final layer in the Commonwealth's approach.

This *2008 Commonwealth of Virginia Technical Plan Blueprint* (Tech Plan Blueprint) provides the CICO and SIEC with data to support the development of a detailed statewide Technical Plan. This document consolidates data gathered through stakeholder interviews, a series of regional meetings, and research from historical data sources. The Tech Plan Blueprint also provides next steps and a suggested outline for a technical strategy document, which will incorporate the many different regions and projects within the Commonwealth into a unified view of the current state across Virginia.

To develop the Tech Plan Blueprint, CICO built upon the framework established in the Ops Model, leveraged the Governor's Regional Preparedness Advisory Committee (RPAC) structure, and continued Virginia's practitioner-driven culture by collecting regional and state input through facilitated data gathering meetings with interoperability subcommittees in each of Virginia's seven RPAC regions. In addition, the Tech Plan Blueprint reflects information gathered in the 2007 Baseline Survey and 2007 Public Safety Interoperable Communications (PSIC) Grant Program.

During the development of the Tech Plan Blueprint, reoccurring projects were identified across the regions. Many rural and urban areas are migrating or upgrading their existing radios to P25 compliant trunked systems. Projects to develop next generation telephony capabilities and establish internet services, including the ability to provide a radio channel bridging capability over a wide geographic area using VoIP technology, are occurring throughout the Commonwealth. Additionally, the procurement of radio caches are increasing as funding becomes available and operational regions work together to acquire them. The Tech Plan Blueprint contains more information about diverse current and planned projects.

The document contains four sections, as follows:

- **Section 1 – Introduction:** This section provides an overview of the purpose and background of the Tech Plan Blueprint as well as the approach executed by the CICO and its staff to gather data and input from across Virginia.

- **Section 2 – Focus Group Data Summary (By Region):** This section summarizes, by region, the technical input and data gathered during the seven RPAC-I meetings. Each region has a general overview, system summaries mapped to the Ops Model Capabilities, and overviews for planned projects.

- **Section 3 – Graphical Analysis:** This section provides a graphical analysis which illustrates the existing 800 MHz trunked radio systems, radio cache resources, and areas covered by COMLINC projects. This perspective allows for a more complete view of the current state by enabling recognition of connections, patterns, and relationships that are not easily evident from text-only information.

- **Section 4 – Next Steps and Conclusion:** This section offers a recommended roadmap that the SIEC Technical Standing Subcommittee can follow to complete the final Technical Plan.

This Tech Plan Blueprint serves as a basis for developing the Technical Plan. The technical summary and project information provided for each region inform the strategic discussions and decision-making that will occur at future SIEC meetings as it develops the long-term, detailed technical approach for the Commonwealth.

1 Introduction

This document, the *2008 Commonwealth of Virginia Technical Plan Blueprint* (Tech Plan Blueprint), provides Virginia's Commonwealth Interoperability Coordinator's Office (CICO) and State Interoperability Executive Committee (SIEC) with data to support the development of a detailed statewide technical plan. To support that goal, this Tech Plan Blueprint consolidates data gathered through stakeholder interviews, a series of regional meetings, and research from historical data sources. This information can support the SIEC as they develop a unified technical plan for Virginia, update the Commonwealth's strategy and initiatives for upcoming years, and allocate resources for improving communications interoperability within Virginia's emergency response community.

1.1 Target Audience

The Tech Plan Blueprint addresses two different audiences: (1) the SIEC members – specifically the Technical Standing Subcommittee members and (2) the system planners and technicians at the regional level who may benefit from knowing what is going on in their region or a neighboring region.

The SIEC Technical Standing Subcommittee members may use this Tech Plan Blueprint to develop the detailed *Technical Plan for Statewide Interoperable Communications* (Tech Plan). They may also refer to this Blueprint when planning for updates to the Commonwealth's strategy and initiatives and when recommending allocation of resources for improving communications interoperability.

To ensure interoperability planning is a priority, the system planners and technicians can use this document to coordinate their projects with neighboring localities, regions, and states by sharing recommended solutions or approaches.

1.2 Background

The *2008 Commonwealth of Virginia Strategic Plan for Statewide Communications Interoperability* (Statewide Plan) continues to be the overarching strategic guide used in efforts to improve interoperability across Virginia. Developed collaboratively, the Statewide Plan contains nine long-term goals, seven objectives, and a 2015 vision statement that collectively describe an ideal future for communications interoperability across the Commonwealth. The CICO and the SIEC update the Statewide Plan annually and specify new initiatives that will achieve incremental progress toward the long-term goals and objectives.

For 2008, Initiative 2 of the Statewide Plan states "Match specific voice and data solutions to identified regional operational needs, and address connectivity and sustainability." Essentially, Initiative 2 calls for a Tech Plan. Specifically, the steps outlined for completion of the Tech Plan include:

- Developing a technology strategy that describes the system of systems vision and the overall direction of interoperability in the Commonwealth
- Evaluating existing technology systems by region to better plan for technology installations
- Identifying opportunities to leverage the Statewide information technical infrastructure projects
- Addressing connectivity and sustainability for interoperability solutions.

The overarching intention behind Initiative 2 was to ensure that the Commonwealth sharpened its strategic focus and decision making with respect to project planning and resource allocation. Initiative 2

is also intended to ensure the Commonwealth develops a unified, stakeholder-driven technical approach to addressing interoperability. The CICO and the SIEC plan to create a sound framework to which all emergency response communications systems across the Commonwealth can align; doing so will provide essential communications capabilities.

This Tech Plan Blueprint serves as a basis for developing the detailed Tech Plan. The technical summary and project information provided for each region inform the strategic discussions and decision making that will occur at future SIEC meetings as the long-term, detailed technical approach for the Commonwealth is developed.

The *Commonwealth of Virginia Operations Model, Version 1* (Ops Model)[1] (Initiative 1 in the Statewide Plan) plays an integral role in the completion of the Tech Plan (Initiative 2). The Ops Model guides the implementation of Virginia's interoperability strategy by defining a collection of future state capabilities. Using a practitioner-driven process, the Ops Model was developed from the input of an Initiative Action Team (IAT) comprised of Virginia's emergency response stakeholders.

To ensure the creation of specific and descriptive capabilities, the Ops Model IAT agreed to use a criteria-based definition for developing future state capabilities (see figure 1). The definition for the future state capabilities calls for the enumeration of a specific stakeholder group, for a variety of incident scenarios, within a defined geographic location or area, and for a defined timescale. Additionally, the data capabilities require the listing of data elements to be exchanged.

A functionality available to:

> **(Who) First responders or other stakeholders**, in
>
> **(What) A given incident type** (NIMS Type 1 – 5*), for
>
> **(Where) A specific geographic location or area**
>
> **(When) Within a given timeframe**
>
> Specific to data, the capability should also list the important data elements/kinds of information that would be exchanged, such as people, equipment, events, resources, suspect information, etc.
>
> **Example: On a daily basis,** any **local law enforcement first responder** can communicate with the **Virginia State Police troopers** (or other state agency personnel) **within their home agency's coverage area immediately upon request.**

Figure 1: Criteria for Defining Future State Capabilities

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[1] The Operation Model can be accessed on the CICO website at the following link: http://www.interoperability.virginia.gov/pdfs/Operations_Model_FINAL_042108.pdf.

* The National Incident Management System (NIMS) typed incidents to make decisions about resource requirements. There are five levels of complexity. See Appendix B for a table that details and provides examples of the five levels.

In the Ops Model, the future state capabilities are organized into categories for voice, data, and supporting functions.

- **Voice** (10 capabilities) – The voice capabilities accounted for a variety of operational needs, including:
  - The involvement of local, state, and federal responders as well as mutual aid responders from other states
  - Voice communications during situations involving multiple disciplines and jurisdictions
  - The ability to use of National Interoperability Channels
  - Statewide long-haul (long-distance) voice pathways
  - Redundant voice communications between local Emergency Operations Centers (EOCs) or Public Safety Answering Points (PSAPs) and the Virginia EOC

Future State Capabilities for Voice[2]
V1. Local agencies have intra-jurisdictional user-to-user and user-to-dispatch center(s) voice interoperability across all disciplines for NIMS Types 1-5 incidents.
V2. Local agencies have voice interoperability capabilities user-to-user and user-to-dispatch center(s) or coordination point(s) for day-to-day use or as needed with all surrounding jurisdictions and State and Federal agencies with established facilities within their jurisdictional borders for NIMS Types 1-4 incidents.
V3. State law enforcement personnel have voice interoperability capabilities user-to-user for day-to-day use or as needed with all local law enforcement personnel in their assigned region/area for NIMS Types 1-5 incidents.
V4. Local, state and federal agency workers assigned to the Commonwealth have voice interoperability capabilities user-to-user and user-to-dispatch center(s)/Command Posts to support a specific incident scene for NIMS Type 3 incidents (e.g., tornado touchdown, multi-day hostage or stand off) established within 4 hours.
V5. Local, state and federal agencies (including Federal, State and Local workers not assigned to the Commonwealth, if called in for mutual aid/expertise) have voice interoperability capabilities user to user and user to dispatch center(s)/Command Post for all responders to an incident established within 24 hours for NIMS Type 2 incidents (incident of regional significance).
V6. Local, state, federal and national mutual aid responders have access to voice interoperability capabilities unit-to-unit and unit-to-dispatch center(s)/Command Post for all responders to the incident within 72 hours for NIMS Type 1 incidents.
V7. All responders, using their own authorized, agency-issued radio, have immediate access to a dispatch center (monitored controlling point) statewide via a National Interoperability Channel – 700, 800, VHF, and UHF – for NIMS Types 1-5 incidents.
V8. There is a statewide long-haul (long-distance) pathway available for use by any jurisdiction, command post, and state agency.
V9. All local EOCs and PSAPs have immediate, redundant voice communications capability with the Virginia Emergency Operations Center and with each other.
V10. Specific to situations requiring the activation of the National Guard, local jurisdictions and state agencies have access to managed, instantaneous regional, statewide, and possibly, national voice emergency communications.

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[2] This table can be found in the *Commonwealth of Virginia Operations Model, Version 1*, page 29.

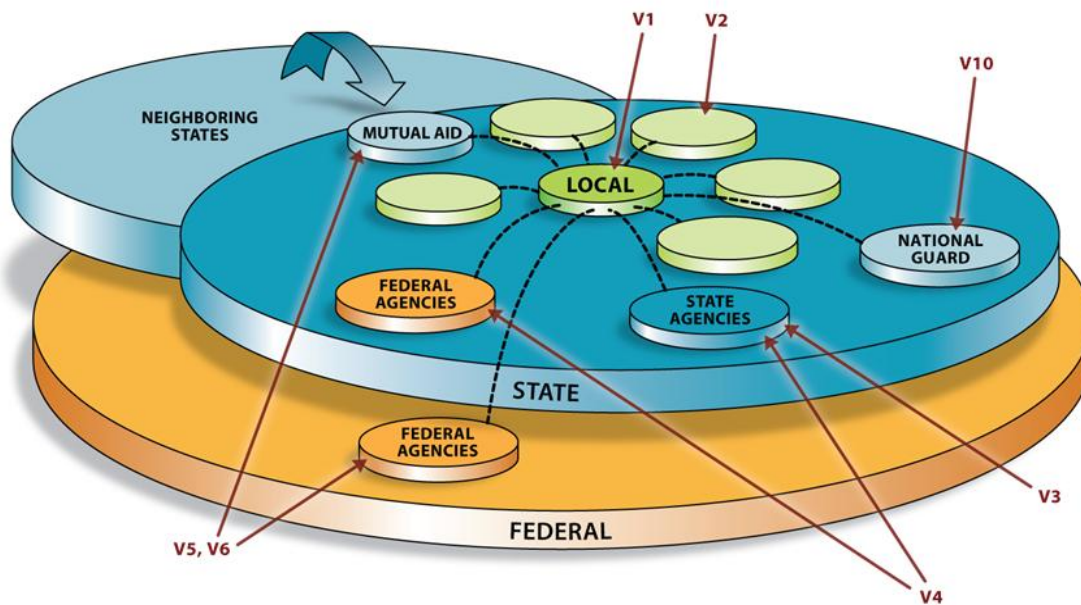These voice capabilities characteristics are notionally depicted in figure 2.

Figure 2: Notional Depiction of the Voice Capabilities

- **Data** (17 capabilities) – The data capabilities accounted for a variety of information sharing needs, including:
    - Enhancing situational awareness
    - Managing resources
    - Supporting decision making
    - Sharing personal and personnel information
    - Raising alerts

Future State Capabilities for Data[3]
D1. All jurisdictions have the capability to exchange flood warning and flood level data with the Virginia EOC and others for NIMS Types 1-5 incidents anywhere in the Commonwealth at any given time.
D2. All jurisdictions have the capability to exchange resource availability and tracking information with the Virginia EOC and others for NIMS Types 1-5 incidents anywhere in the Commonwealth at any given time.
D3. All jurisdictions (including Federal agencies) and critical infrastructure partners have the ability to exchange plume modeling and sensor information with the Virginia EOC and local response agencies for NIMS Types 1-4 incidents anywhere in the Commonwealth within 30 minutes.
D4. Local Jurisdictions, VDOT and the Virginia EOC have the capability to exchange traffic and transport related information, to include HAZMAT shipment location information, for NIMS Types 1-5 incidents anywhere in the Commonwealth to provide for display on GIS and Common Operating Picture.

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[3] This table can be found in the *Commonwealth of Virginia Operations Model, Version 1*, pages 42-43.

Future State Capabilities for Data[3]
D5. All jurisdictions have the capability to exchange incident information necessary to support incident mapping with the Virginia EOC and others for NIMS Types 1-5 incidents anywhere in the Commonwealth at any given time.
D6. All local EOCs have the capability to exchange shelter status information with the Virginia EOC and others for NIMS Types 1-4 incidents anywhere in the Commonwealth within one hour of activation of the State EOC.
D7. All utilities have the capability to exchange outage information with the Virginia EOC for NIMS Types 1-4 incidents anywhere in the Commonwealth.
D8. All jurisdictions have the capability to receive weather related information from the National Weather Service for NIMS Types 1-5 incidents.
D9. State agencies (specifically the VaNG/VDMA) have the capability to track the location of their personnel anywhere in the Commonwealth at any given time for NIMS Types 1-4 incidents.
D10. The Virginia EOC will have the capability to integrate federal products, including those from the Department of Defense, with its products for NIMS Types 1-5 incidents at any given time and provide them to state agencies and localities.
D11. Federal and state response agencies have the capability to instantaneously export common operating picture information to federal customers in a usable format for NIMS Types 1-5 incidents.
D12. Police, sheriff, and other law enforcement agencies and dispatch center(s) have data exchange capabilities with each other for NIMS Types 1-3 incidents within their jurisdictions and with surrounding jurisdictions as needed/on demand.
D13. Specialized regional response teams (HAZMAT, civil support teams, Search and Rescue, etc.) have mobile data exchange capabilities unit-to-unit, unit-to-dispatch center/EOC for NIMS Types 1-4 incidents within all jurisdictions as needed/on demand. The data exchanged is in support of incident mitigation/response.
D14. Local, State and Federal agencies (including federal, state and local workers not assigned to the Commonwealth, if called in for mutual aid/expertise) have the capability to exchange incident information unit-level to Incident Command or EOC(s) and EOCs-to-EOC(s) for NIMS Types 1-2 incidents (large-scale incidents) within 24 hours.
D15. All agencies within the Commonwealth have the capability to exchange EOC activation updates, incident occurrence information, and traffic advisories with other response agencies as needed, and the State EOC for NIMS incident types 1-5 upon incident occurrence.
D16. All agencies within the Commonwealth have the capability to verify personnel credentials during incident response situations NIMS incident types 2-5 within four hours.
D17. All agencies within the Commonwealth (as allowed by the Health Insurance Portability and Accountability (HIPPA) Act regulations) have the capability to exchange patient/victim information for NIMS incident types 1-5 within 4 hours.

These data capabilities are grouped according to the categories depicted in figure 3.
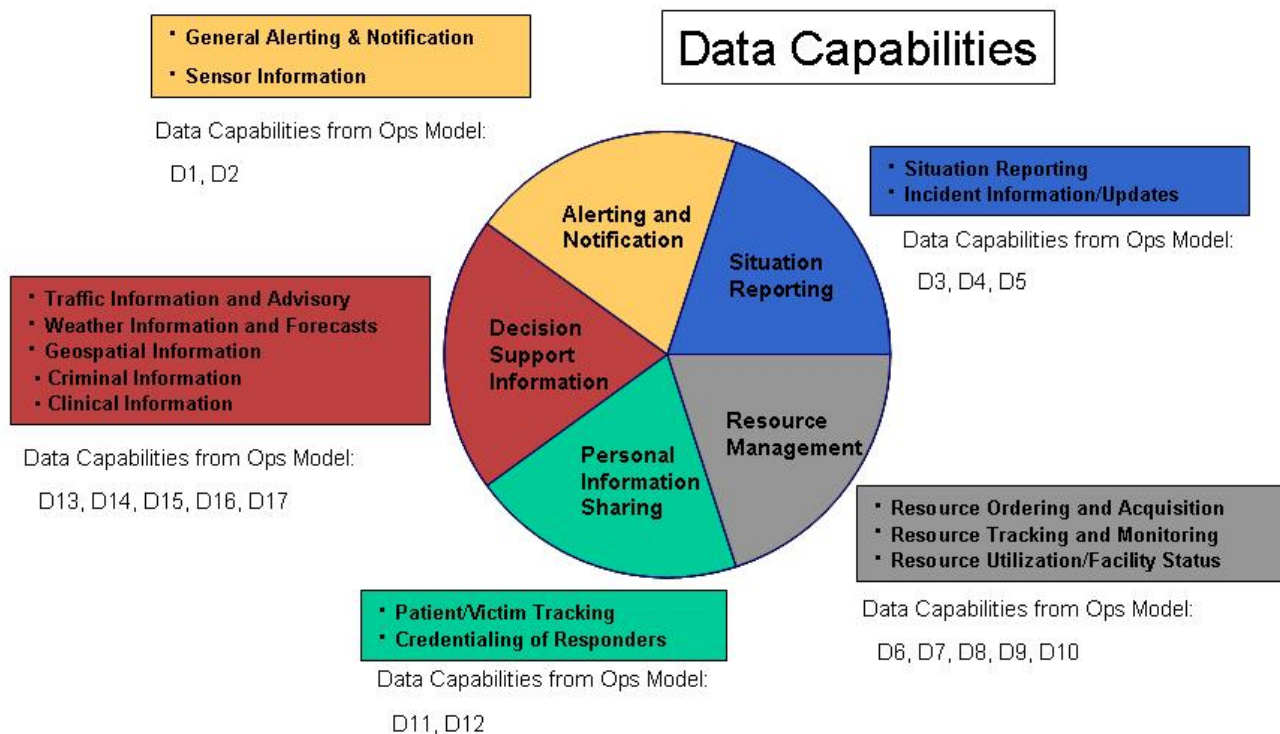

Figure 3: Future State Capabilities for Data

- **Supporting Functions** (6 capabilities) – The supporting function capabilities describe resources and processes that provide assistance with decision making, collaboration, coordination, and planning prior to an incident occurrence. Although these capabilities are not technical, they must be in place and in use as part of the current operational framework long before an actual event in order for them to support improved communications interoperability "on-scene."

Future State Capabilities for Supporting Functions[4]
S1. Public safety communications systems managers and planners have access to a secure, centralized database to develop communications plan, technical plans, and strategic documents for the State and for use in their localities.
S2. Local, State and Federal agencies within the Commonwealth have established Memorandums of Understanding (MOUs) regarding radio interoperability and governance model that will be used to provide ongoing implementation of equipment/systems, policies and training.
S3. Local, State and Federal agencies within the Commonwealth have policies regarding radio interoperability that are developed through an established and open governance model that promotes input and consensus from all involved partners, across all disciplines, jurisdictional boundaries and levels of government.

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[4] This table can be found in the *Commonwealth of Virginia Operations Model, Version 1*, page 50.

Future State Capabilities for Supporting Functions[4]
S4. Local, State and Federal agencies distribute approved policies and train front line personnel regarding same; and train front line supervisory communications personnel on use of equipment and/or systems used to enable interoperability.
S5. Consensus on interoperability policies is needed by 2015 to effectively address interoperable solutions for all situations of differing scales (NIMS Types 1-5) and specific situations that are reoccurring (pursuits, requesting radio interoperability solutions outside of the requestors' jurisdiction or region, etc.).
S6. Communities should evaluate whether their policies adhere to the established goals of the Strategic Plan and Ops Model and clearly understand the impact and define mitigation steps when policy alignment is not in place.

1.3 Building on Past Successes

CICO contracted with Touchstone Consulting Group to provide the Commonwealth with a technology blueprint that outlines the technical infrastructure, projects, and partnerships needed to achieve the future state capabilities set forth in the Ops Model.

To develop the Tech Plan Blueprint, CICO applied proven processes and employed past successes across the Commonwealth. For example, CICO built upon the framework established in the Ops Model, leveraged the Governor's Regional Preparedness Advisory Committee (RPAC) structure, and continued Virginia's practitioner-driven culture by collecting regional and state input through data gathering meetings with interoperability subcommittees in each of Virginia's seven RPAC regions. In addition to stakeholder input, this document includes information gathered in the 2007 Baseline Survey and 2007 Public Safety Interoperable Communications (PSIC) Grant Program.

Highlight: Leveraging the RPAC Structure

The Governor's Office of Commonwealth Preparedness (OCP) established the RPACs to assist with overall preparedness planning and to guide the awarding process for certain grants. Similarly, the CICO, which is within OCP, and the SIEC seek to leverage OCP's RPAC structure by creating Regional Preparedness Advisory Committees for Interoperability (RPAC-Is). The RPAC-Is will address planning efforts specific to voice and data interoperability by meeting on a regular basis to provide regional input and recommendations to the CICO and SIEC. The input provided by the seven RPAC-Is will impact the statewide strategy and initiatives and promote a more complete view of the Commonwealth's public safety communications. To further diversify the perspectives and ensure statewide collaboration, representatives from each of the seven RPAC-Is will sit on the SIEC.

As part of the effort to launch and leverage the RPAC-Is, Constance McGeorge – Virginia's Commonwealth Interoperability Coordinator – convened local and state representatives in each of the seven regions to communicate their role in the collaborative effort to improve communications interoperability and to gather data in support of this Tech Plan Blueprint. (The map below outlines the seven regions and appendix A contains a full list of cities and counties in each region). At each meeting, regional stakeholders worked together, making strides toward achieving the following outcomes:

- Agreement on participating as an RPAC-I in the Commonwealth's Governance Structure for Interoperability
- Opportunity to network and share experiences with other stakeholders within the region
- Shared understanding of the 2008 Statewide Plan and the Ops Model
- Stakeholder input on current and potential regional projects for Virginia's Tech Plan Blueprint and for future statewide planning efforts

The schedule for each of the RPAC-I meetings was as follows:

- Region 1 (Richmond) on July 10 in Chester, Virginia
- Region 2 (Culpeper) on July 24 in Culpeper, Virginia
- Region 3 (Central Virginia) on July 15 in Appomattox, Virginia
- Region 4 (Southwest) on July 17 in Abingdon, Virginia
- Region 5 (Tidewater) on July 21 in Chesapeake, Virginia
- Region 6 (Roanoke) on July 28 in Bedford, Virginia
- Region 7 (Northern Virginia) on August 28 in Alexandria, Virginia

1.4 Aligning the Tech Plan Blueprint to the Commonwealth's Strategic Approach for Improving Communications Interoperability

Figure 4 shows how the Tech Plan fits into the implementation of the Statewide Plan and how each element of Virginia's interoperability strategy interacts with others to inform next steps and decisions.
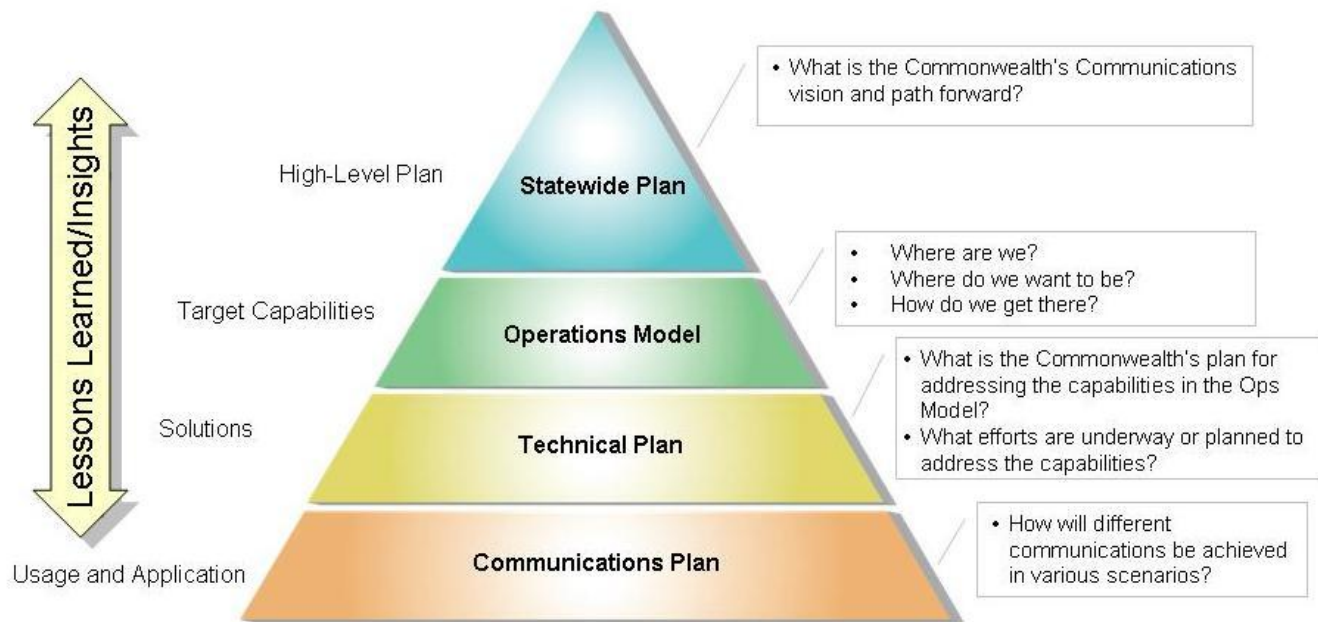
Figure 4: Virginia's Strategic Approach for Improving Communications Interoperability

At the top level, the Statewide Plan describes the high-level vision, goals and objectives of the Commonwealth. The document sets a broad vision for the Commonwealth and serves as a unifying platform for all stakeholders. The Statewide Plan was critical to the Commonwealth's efforts because it set initial milestones that informed the SIEC's allocation of resources and investment priorities in terms of funding. As the Commonwealth's efforts mature, more detail is needed to make sure every stakeholder, individual region, and locality move forward with a directed focus.

To that end, the next layer of the Commonwealth's Strategic approach required the creation of the Ops Model (which was completed in May 2008). The Ops Model provides an additional layer of description to the Statewide Plan by defining "Where do we want to be?" through three sets of descriptive future state capabilities (see Section 1.2 for full lists).

Next, the Tech Plan – Initiative 2 in the 2008 Statewide Plan – defines what Virginia is doing to achieve the future state capabilities defined in the Ops Model. The Tech Plan Blueprint is a milestone in the process of developing the Tech Plan.

The final layer in the Commonwealth's strategic approach for improving communications interoperability is the Communications Plan, which is currently in the early planning and conceptualization phase. The intent behind the Communications Plan is to develop regional or locally-focused tactical plans for how each community will interconnect with its primary mutual aid partners and how they will support each other and share resources. These tactical interoperable communications plans will be compiled into a statewide plan as a final step in the Commonwealth's approach.

1.5 Process for Creating the Tech Plan

Figure 5 illustrates the core tasks in the process for creating the Tech Plan. These include conducting informational interviews, facilitating regional meetings, analyzing the regional data, providing the Blueprint to the SIEC's Technical Standing Subcommittee, and ultimately, developing the Tech Plan. The Tech Plan Blueprint marks the end of the data collection phase of this effort. In the next phase, the SIEC and volunteer practitioners will collaborate to develop a detailed Tech Plan.

Initiative 2: Technical Plan

CICO & SIEC

Statewide Plan

Initiative 1: Operations Model

7 RPAC-Is

State Agency & Federal Partners

Outcomes for RPAC-I Sessions

- Agreement on participating as a Regional Preparedness Advisory Committee on Interoperability (RPAC-I) in the Commonwealth's Governance Structure for Interoperability

- Opportunity to network and share experiences with other stakeholders within the region

- Shared understanding of the 2008 Statewide Plan and the Operations Model

- Stakeholder input on current and potential regional projects for Virginia's Tech Plan Blueprint and for future statewide planning efforts

Outputs:
- Regional input and perspective on current and future interoperability projects

Compile & Analyze Regional Data

Tech Plan Blueprint
I.
II.
III.
IV.

SIEC Technical Standing Committee

Completion of Initiative 2

Tech Plan
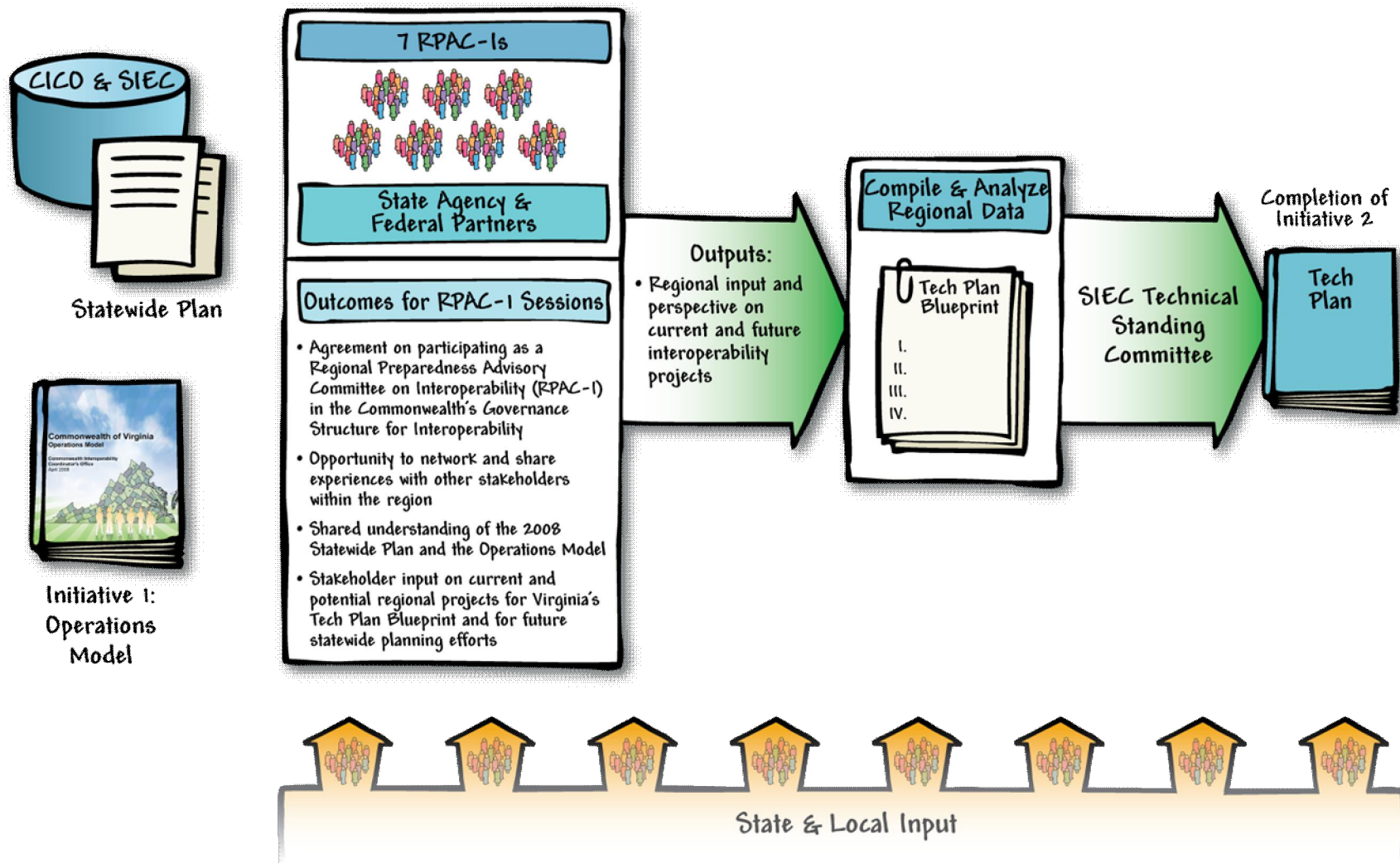
State & Local Input

Figure 5: Process Overview for the Creation of the Tech Plan

1.5.1 Progress to Date: Developing the Tech Plan Blueprint

The process for developing the Tech Plan Blueprint incorporates the Ops Model's future state capabilities lists. Practitioners from across Virginia collaboratively vetted these lists during the process of creating the Ops Model was created in the spring of 2008 so they provide a statewide description for the desired future state capabilities for interoperability. By converting the lists into a framework for discussion at the regional level, each region determined which capabilities it already had, which capabilities were currently being addressed, and what projects it planned to undertake for addressing any gaps. This proved extremely useful in maintaining a common structure for discussion during each regional meeting.

Detailed steps and processes used to gather data for the Tech Plan Blueprint follow along with the envisioned next steps for completing the detailed Tech Plan:

Step 1: Conduct Interviews of Individuals around the Commonwealth
The first step in preparing for the regional meetings was to conduct stakeholder interviews. Reaching out to a sample of stakeholders in each of the seven regions provided CICO with a high-level understanding of what was happening in each region across the Commonwealth. With a foundation of knowledge about current activities and challenges, CICO was able to anticipate important discussions that could arise in the meetings. Additionally, this interview-style data gathering prior to a meeting supports the creation of customized meeting agendas that maximize the use of participants' time.

Step 2: Facilitate Regional Meetings to Map Regional Input to the Future State Capabilities Lists
Facilitated meetings were held in each of the seven regions to gather input and match existing capabilities to the capabilities identified in the Ops Model. This process helped engage the emerging RPAC-I structure and ensured stakeholders' participation in the development to the statewide Tech Plan and future updates of the statewide strategy. Each RPAC-I contributed data that the CICO and SIEC may use to assemble a statewide view.[5]

The Future State Capabilities identified in the Ops Model were used to collect input from each RPAC-I participant regarding current and planned voice and data projects. Participants in each of the regional meetings were asked to identify which of the Ops Model capabilities they already achieved and to identify which capabilities they might achieve through the implementation of their planned projects. Discussions were then facilitated and synthesized into summary reports, which were subsequently incorporated into this Tech Plan Blueprint.

Step 3: Analyze the Regional Data to Develop a Statewide Technical Plan
After all regions had provided input, the information was summarized into this Tech Plan Blueprint. This document contains the analysis of themes, regional priorities, and common projects and gaps that were uncovered through the regional meetings. The Tech Plan Blueprint serves as preliminary input for the development of the Tech Plan.

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[5] Notably, CICO emphasized that participation in the regional process did not override each region or locality's identity or autonomy. Participation in the collaborative statewide governance structure for interoperability remains voluntary; however, participation is a critical success factor and an important mechanism for ensuring a cohesive and efficient planning process.

Step 4: Task the Technical Standing Subcommittee to Develop Solution Requirements and Detailed Plans (to begin in FY 2009)

The Tech Plan Blueprint will be shared with the SIEC's Technical Standing Subcommittee in September 2008. The Technical Standing Subcommittee can conduct its own review and validation of the common trends and themes pulled from the regional focus group data. The Technical Standing Subcommittee expects to begin developing a detailed Tech Plan by infusing the high-level information contained in this Tech Plan Blueprint with the Subcommittee's historical knowledge of what will work in the Commonwealth and what will be challenging. The Tech Plan will begin to identify guidance, solutions, and best practices for filling the most common regional gaps within the Commonwealth and for coordinating resources and projects.

1.6 Guiding Principles for Creating the Tech Plan

Notably, the SIEC will not work in isolation to create the Tech Plan. As it has done since the beginning, the SIEC will commit to involving the input of the emergency response community in an open dialogue in order to maintain its stakeholder-driven approach to solving communications interoperability challenges. Stakeholder input will be included through regional and association representatives that sit on the SIEC and through collaborative review meetings with emergency responders from across Virginia.

Other critical success factors for creating the Tech Plan include:

- Leveraging the Ops Model Future State Capabilities as a framework

- Developing a cohesive, integrated technical approach for the Commonwealth that better promotes a more holistic approach for Virginia's future interoperability efforts

- Strengthening and involving the Regional Preparedness Advisory Committees for Interoperability to continually provide input, buy-in, and recommendations

- Ensuring that the direction and guidance documented in the Tech Plan reflects the requirements of the Commonwealth

- Anticipate possible benefits as well as challenges for implementation and associated system build-out of the Tech Plan

1.7 How to Use the Tech Plan Blueprint

The Tech Plan Blueprint consolidates and summarizes data on the technical activities occurring across the Commonwealth. It also identifies where each region is and on what type of technical approach each region has prioritized its resources. This data, in addition to active discussions with the RPAC-Is, will be useful to the CICO and the SIEC in supporting the creation of a common picture of current activities statewide. With a consolidated snapshot of activities across the Commonwealth, a more directed and focused Statewide Plan will link efforts across different regions and localities to address communications interoperability gaps.

Objectively reviewing the data in the Tech Plan Blueprint and brainstorming creative solutions will also identify opportunities where cross-regional activities can be mutually beneficial or combined for greater efficiency. This will lead to more efficient resource allocation. Finally, the data in this Tech Plan Blueprint can serve as a reference document for system planners and technical advisors in any region or locality. Their technical knowledge combined

with this summary data can be used to anticipate potential roadblocks or barriers in the event that two localities or regions are pursuing conflicting technical approaches.

The remaining sections of this Tech Plan Blueprint include:

- **Section 2 – Focus Group Data Summary (by Region)**
  - General overview of capabilities that are already addressed
  - System summaries and projects planned that map to the capabilities

- **Section 3 – Graphical Analysis**
  - Graphical representations that illustrate common technical information throughout the Commonwealth

- **Section 4 – Next Steps and Conclusion**
  - Recommended roadmap for developing the detailed Tech Plan
 - Potential outline for the Tech Plan

2 Focus Group Data Summary (By Region)

This section provides a summary of system and project data for each of the seven (7) regions in the Regional Preparedness Advisory Committee structure across the Commonwealth. These summaries offer a thorough snapshot of technical planning and strategy in each of the regions. With this information, system planners and technical strategists have a foundation from which to hold informed discussions about future adjustments and improvements to Virginia's technical approach for achieving communications interoperability. Notably, this regional data is not intended to serve as a detailed baseline. In future planning, the SIEC will leverage this reference material as well as direct input and feedback from Virginia's practitioners to allocate resources and improve Virginia's strategy for achieving communications interoperability.

To compile each summary, CICO's facilitators used the Future State Capabilities identified in the Ops Model as a framework for discussion during regional focus groups. Stakeholders in each focus group provided input regarding current and planned voice and data projects and helped map how those projects aligned to the Future State Capabilities. See Section 1.2 for the Future State Capabilities lists.

Below is the technical information shared by the participants in the recent RPAC-I kickoff meetings. Additional information may be collected to support development of the Commonwealth's technology strategy.

Region 1: Richmond
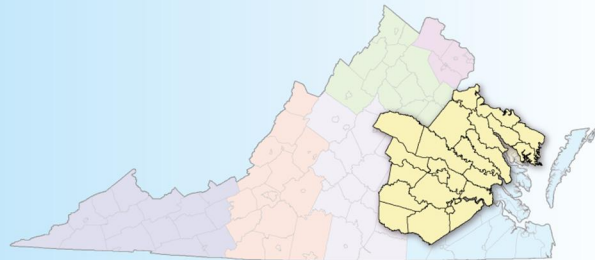
Region 1 is diverse with regard to the level of technology present in each jurisdiction. Systems vary from advanced to basic. Jurisdictions are focused on a wide range of needs including voice operability, voice interoperability, data interoperability and information sharing.

The Capital Region, consisting of the City of Richmond, Chesterfield County, and Henrico County, has created a shared 800 MHz trunked system by connecting all three of their Motorola systems to a common SmartZone controller and providing some shared talkgroups. Users on select regional talkgroups have the ability to roam while on these shared talkgroups. Hanover

County currently operates an 800 MHz M/A-COM Enhanced Digital Access Communications System (EDACS) system. Hanover is in the process of installing a P25 compliant 800 MHz Motorola system that will be compatible with the Capital Region radio network

Five jurisdictions in this region are supported by an interoperability radio network of fixed repeaters that provide 800 MHz national interoperability channels. Participants noted that this network has the potential to support interoperability with Virginia State Police (VSP); however, VSP policy does not support their use of the system. The State Interdepartmental Radio System (SIRS) channel is used for law enforcement mutual aid in this region.

The Hospital Emergency Administration Radio (HEAR) system (which operates on conventional VHF) is used for hospital-to-hospital and Emergency Medical Services (EMS)-to-hospital communications.

Most systems outside of the Capital Region are conventional VHF or UHF systems with only basic functionality. Some of these communities are striving to improve operability. For example, Nottoway County will be installing satellite receivers (funded by a Public Safety Interoperable Communications (PSIC) grant) to improve basic coverage.

Limited VHF channel availability was mentioned as a problem for jurisdictions operating in that band. Communications with and accessibility to Fort Lee was also mentioned as a problem area.

The following are some select voice radio systems and resources available in Region 1, particularly those that support regional interoperability:

Table 1: Current Voice Systems and Resources

Regional System Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Capitol Region 800 MHz Radio System Network	This is a shared radio system that supports the City of Richmond, Henrico and Chesterfield County. Each jurisdiction has a Motorola 800 MHz trunked system that is connected to a common SmartZone controller.	V1, V2
Cities of Petersburg, Colonial Heights and Hopewell	Utilize compatible 800MHz Motorola trunked system, Petersburg is also P25 compliant	V1, V2
Regional 800 MHz National Interoperability Channel System	This tower trailer provides an 800 MHz mutual aid repeater system in five jurisdictions. It supports national 800 MHz interoperability frequencies. Internal VSP policy restricts the use of these channels for state-to-local interoperability; however, the technology is able to support interoperability with state agencies.	V2, V3 (potential), V4-7
SIRS	SIRS is a statewide law enforcement mutual aid system	V3
HEAR	The HEAR system supports hospital-to-hospital and EMS-to-hospital communications.	V2
Richmond Strategic Radio Cache	This is a radio cache for the Original Richmond Metro UASI Region (Chesterfield, Goochland, Hanover, Henrico, Richmond)	V4-7
State Radio Cache	The State radio cache is a larger radio cache	V4-7
State Nextel Contract; Radio Caches	Sprint Emergency Response Team	V6

There are several projects in progress in Region 1 that will support improved communications and interoperability. Region 1 was an initial Commonwealth's Link to Interoperable Communications (COMLINC) pilot area. COMLINC is intended to provide a Voice over Internet Protocol (VoIP) radio bridging capability local-to-local and local-to-state. The capability is provided through the use of Motorola Motobridge technology and a common IP network. An important function of this network is to patch local law enforcement responders to state police. Meeting participants noted that a major obstacle to full implementation has been the lack of funding for line charges necessary to connect to the network (note: grant funding ran out). Participants also identified funding for training and regular usage as being necessary for successful implementation of COMLINC.

The following summarizes select projects that are in progress:

Table 2: Voice Projects in Progress

Project Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
COMLINC	COMLINC supports bridging between local systems and between locals and state police (STARS). Through COMLINC multiple jurisdictions in Region 1 are connected through a Motorola Motobridge VoIP gateway network. Subscriber units constrained to local system coverage (i.e., they cannot roam outside of their home coverage area). Funding for IP connection to the COMLINC network is a barrier to continued use.	V3
Control Stations: Prince George County, Petersburg	Installing control stations to support interoperable communications.	V2
Planning District 15 PSIC microwave voice/data project	Voice and data connectivity between multiple sites with in Planning District 15 region (Emergency Operations Center (EOC), 911 centers, etc) to support voice and data collaboration including video conferencing, VoIP phones, and messaging. Capable of supporting COMLINC traffic.	V1-3, V9
Nottoway County	Installing land mobile radio satellite receivers to improve coverage	V1

The following table summarizes voice projects that are in the planning phase.

Table 3: Planned Voice Projects

Planned Project	Description (system info, users, problem areas, etc)	Capability Addressed
Amelia/Nottoway/Brunswick Grant Project	These counties are working together to address regional interoperability. (note: Brunswick is in Region 5)	V1-3

Voice needs

- Localities with resources committed to statewide response programs (Regional HAZMAT and Regional Technical Rescue need access to the State Agencies Radio System (STARS).

Although voice interoperability has been the focus in this region (and across the Commonwealth), there are various important data applications that support emergency services. The meeting participants identified numerous current and planned projects and data capabilities for the region. Current and planned projects and needs include the following:

Current Data Projects

- Regional microwave (see Planning District 15 project described above)
- Virginia Information Technologies Agency (VITA) statewide IP network being developed by Northrop Grumman
- WebEOC
   - Used by the State EOC and local EOCs

- o Used by hospitals and the Regional Hospital Coordination Center (RHCC) and Virginia Department of Health (VDH)
    - o Tracking resources at the state level
    - o Use of Geographic Information Systems (GIS) mapping
- Ham radio data communications throughout region for hospitals
- Patient tracking system (Red Cross web site to track victims)
- Virginia Criminal Information Network (VCIN) data communications for law enforcement
- EMnet
    - o Satellite-based emergency messaging system serving state EOC and county government EOCs
    - o Henrico currently installing
- Government Emergency Telecommunications Service /Wireless Priority Service (GETS/WPS) system – priority access to public telephone system for emergency responders
- Online traffic information system (Chesterfield, Henrico, Richmond)
- Connection to Virginia Power
- City of Richmond 2-way paging technology
   - o Partnering with State to expand coverage

Planned data projects

- Ham internet upgrade

Data needs

- Designation and establishment of data sharing networks
- Credentialing
- Ham upgrade to provide internet connectivity
- Public Safety Answering Point (PSAP) GIS updates
- Computer Aided Dispatch (CAD) data sharing
    - o Share data between CAD systems in Emergency Communications Center's (ECC) for inter-jurisdictional response and regional response
- Extend Integrated Flood Observing and Warning System (IFLOWS) throughout Region 1
- Resource availability and tracking
    - o Know more about regional resources
    - o Develop process and assess resources
- Computer-Aided Management of Emergency Operations (CAMEO) – program is free, but funding is needed for training
- Coordinate credentialing

Region 2: Culpeper
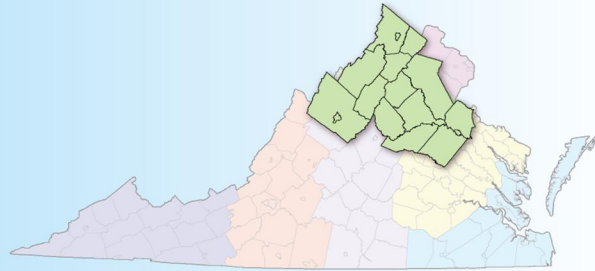
Region 2 is diverse in the types of systems present in each jurisdiction. Jurisdictions are focused on a wide range of needs including voice operability, voice interoperability, information sharing, and information access.

Of the thirteen counties located in Region 2, approximately half are supported by 800 MHz trunked radio systems. Of the counties operating in 800 MHz, some are supported by M/A-COM systems and others by Motorola. Most of the other jurisdictions in the region are supported by conventional VHF or UHF.

The use of mutual aid channels was noted including statewide channels and local national interoperability channels.

A variety of methods are used to establish communications between local law enforcement agencies and the VSP. The SIRS channel is used by some jurisdictions while others rely on swapping radios, patching, and using available national interoperability channels.

Table 4 summarizes select voice radio systems and resources available in Region 2, particularly shared systems and those that support regional interoperability:

Table 4: Current Voice Systems and Resources

Regional Systems and Resources	Description (system info, users, problem areas, etc)	Capabilities Addressed
Harrisonburg-Rockingham 800 MHz radio system	Shared M/A-COM (EDACS) 800 MHz trunked radio system	V1, V2
Fauquier County / Culpeper County / Rappahannock County	All have Motorola 800 MHz Trunked Radio Systems. To maximize interoperability both Culpeper and Fauquier County share the master site (primary system control) as part of Fauquier's radio system.	V1, V2
SIRS	Statewide law enforcement mutual aid system	V3
Harrisonburg-Rockingham statewide radio cache	200+ portable radios (Motorola & M/A-COM) and supporting radio and bridging equipment available as a regional and statewide resource.	V2, V4-6

Rockingham County in Region 2 is part of a COMLINC project that covers multiple counties in Region 3 and Region 6. COMLINC can provide radio bridging local-to-local and local-to-state. This regional VoIP project will use SyTech Radio Inter Operability System (RIOS) technology and a common IP backbone network to provide this bridging capability.

Two other counties (Madison and Culpeper) mentioned the use of SyTech RIOS gateway technology.

The following summarizes select voice projects that are in progress:

Table 5: Voice Projects in Progress

Project Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Lynchburg/Roanoke COMLINC project (SyTech)	COMLINC using SyTech technology (VoIP) covers some jurisdictions in Region 6 and Region 3. Rockingham County is also included as part of this project. COMLINC supports bridging between local systems. Can also support bridging between locals and state police (STARS). Subscriber units constrained to local system coverage (i.e., they cannot roam outside of their home coverage area).	V2, V3
Enhancement of Harrisonburg-Rockingham statewide radio cache	Additional radios added through PSIC grant	V2, V4-6
Clark and Warren VHF cross band repeater	Allows VHF users in Clarke and Warren interface to 800 MHz system in Fauquier	V2
Harrisonburg-Rockingham	Providing infrastructure to support VHF and UHF national interoperability channels.	V2, V4-6

Although voice interoperability has been the focus in this region (and across the state), there are various important data applications that support emergency services. The meeting participants identified some current and planned projects and data capabilities for the region.
The following summarizes current and planned data projects and needs:

Current Data Projects

- State managed WebEOC
- Local WebEOC
- Healthcare
  - o Winlink 2000 (email and messaging via amateur radio)
  - o Internet WebEOC resource availability, patient tracking, health and welfare messages
  - o The Virginia Hospital & Healthcare Association (VHHA) operates a web site that shares critical emergency management information needed by Virginia hospitals and healthcare providers (e.g., surge capabilities, bed availability, supplies).
- VITA/NG partnership - statewide IP backbone
- Mobile data capabilities in some counties
- Statewide Alerting Network (SWAN)
- National Warning System (NAWAS)

Planned data projects

- Fire base Mobile Data Terminal (MDT) system (Fauquier)

Region 3: Central Virginia
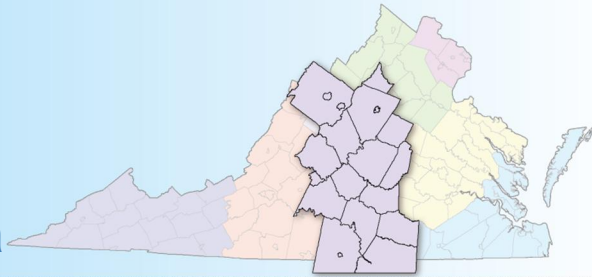
Region 3 is diverse with regard to the level of technology present in each jurisdiction. Systems vary from advanced to basic. Jurisdictions are focused on a wide range of needs including voice operability, voice interoperability, information sharing, mobile data services, and multi-jurisdictional microwave communications.

There are several shared 800 MHz trunked systems in Region 3. Most voice radio systems outside of the urban areas are conventional VHF or UHF. Some of the more rural communities in this region are striving to improve operability as well as interoperability.

The City of Charlottesville, Albemarle County, the Charlottesville-Albemarle Regional Airport and the University of Virginia are supported by a shared 800 MHz Motorola trunked radio system. The County of Fluvanna is exploring the possibility of joining the Charlottesville-Albemarle 800 MHz system.

The County of Amherst and City of Lynchburg are part of a shared M/A-COM Enhanced Digital Access Communications System (EDACS) 800 MHz trunked system that also supports the City and County of Bedford. Campbell County is not part of the system; however, it is interfaced to this system with limited conventional capabilities. A patch is set up between Liberty University and Lynchburg. A patch capability is also available between VSP, Appomattox, and Lynchburg.

It was noted that there are several statewide mutual aid channels used in this region. The SIRS channel is commonly used for law enforcement mutual aid. The Hospital Emergency Administration Radio (HEAR) radio system (which operates on VHF) is available for hospital-to-hospital and EMS-to-hospital communications. There are also statewide mutual aid channels available in the VHF band to support fire communications.

In addition to HEAR radio system, participants noted that one of the PSIC grants will support P25 2-way voice radio communications for each hospital and RHCC.

The following table highlights select voice radio systems and resources available in Region 3, particularly those that support regional interoperability:

Table 6: Current Voice Systems and Resources

Regional System Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Albemarle/Charlottesville Shared 800 MHz Trunked Radio System	Motorola 800 MHz Trunked Simulcast System Supports the City of Charlottesville, Albemarle County, the Charlottesville-Albemarle Regional Airport and the University of Virginia. Has a bridging capability that supports interoperability with Fluvanna (VHF).	V1, V2
Central Planning District System	M/A-COM (EDACS) 800 MHz trunked radio system that supports multiple jurisdictions including City of Lynchburg, City of Bedford, County of Bedford and County of Amherst.	V1, V2
SIRS	Statewide law enforcement mutual aid system	V3
Statewide Fire Mutual Aid	Statewide VHF channels to support fire mutual aid response	V2
HEAR	Hospital-to-hospital and EMS-to-hospital communications. Finding strengths and weaknesses to meet narrowband requirement.	V2

Region 3 and some jurisdictions in Region 6 are part of a COMLINC project that involves installing VoIP bridging technology. COMLINC can provide radio bridging for local-to-local and local-to-state communications. In this region, COMLINC will be achieved using SyTech RIOS technology and a common IP backbone network. Meeting participants noted that there is often a misconception that State Agencies Radio System (STARS) and COMLINC are combined projects; in reality, they are separate. Participants also pointed out that COMLINC is achieved with various equipment—not only Motorola equipment. For example, COMLINC in this region is achieved using SyTech equipment.

The following table summarizes select voice projects that are currently in progress:

Table 7: Voice Projects in Progress

Project Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
COMLINC (SyTech)	COMLINC using SyTech technology (VoIP) covers jurisdictions in Region 3 and Region 6. COMLINC supports bridging between local systems. Can also support bridging between locals and state police (STARS). Subscriber units constrained to local system coverage (i.e., they cannot roam outside of their home coverage area).	V3
Cumberland County	3-tower simulcast VHF system including IP transport infrastructure	V1
Mobile Command Center MOU	Between Cumberland, Buckingham, Powhatan, Farmville	V2
RHCC voice communications	PSIC grant to provide 2-way communications between RHCCs and hospitals.	V2

The following table summarizes voice projects that are in the planning phase.

Table 8: Planned Voice Projects

Planned Project	Description (system info, users, problem areas, etc)	Capability Addressed
OEMS (EMS vehicle radios)	OEMS planed project to supply EMS vehicles radios with voice interoperability between first responders and hospitals.	V2

Although voice interoperability has been the focus in this region (and across the state), there are various important data applications that support emergency services. The meeting participants identified numerous current and planned projects and data capabilities for the region.

A multi-jurisdictional Mobile Data System supports the County of Albemarle, City of Charlottesville, and University of Virginia. This low data rate wireless system supports some fire and EMS functions; however, it primarily provides law enforcement personnel in the field access to local and state computer databases, such as the local Wants and Warrants file and the Virginia Criminal Information Network (VCIN).

Lynchburg Police also have a mobile data system.

WebEOC is a common application used for crisis management.

The following summarizes current and planned data projects and needs:

Current Data Projects

- Nelson County regional microwave system (funded by PSIC grant)
- Albemarle/Charlottesville/Fluvanna regional broadband wireless project. Public/Private partnership to obtain a common broadband wireless service (funded by PSIC grant)
- Cumberland countywide mobile data system
- Healthcare
  - Winlink 2000 (email and messaging via amateur radio)
  - Internet WebEOC resource availability, patient tracking, health and welfare messages
  - The Virginia Hospital & Healthcare Association (VHHA) operates a web site that shares critical emergency management information needed by Virginia hospitals and healthcare providers (e.g., surge capabilities, bed availability, supplies).
- Emergency Management Mapping Application (EMMA) mapping application available in Charlottesville
- VITA/Northrop Grumman partnership - statewide IP backbone
- Integrated Flood Observing and Warning System (IFLOWS) in Nelson, Augusta, and Waynesboro areas
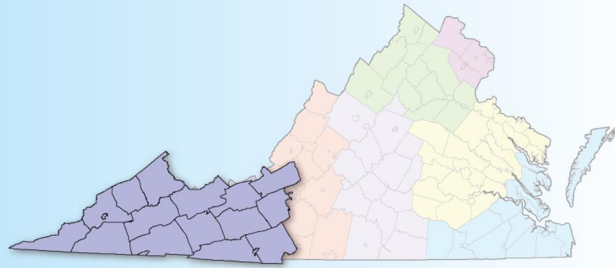
Planned data projects

- Initial discussion – Stanton/Augusta/Waynesboro shared and hosted data services
- IFLOWS upgrade (dependent of funding)

Data needs

- Many jurisdictions, especially in the southern part of the region, have little or no GIS capability.

- WebEOC training needed

Region 4: Southwest

Region 4 operates multiple independent voice radio systems. Jurisdictions are focused on a wide range of needs including voice operability, voice interoperability, information systems, information sharing, and mobile data services. The region is leveraging PSIC grant money to improve operability and interoperability by buying radio equipment and creating a multi-jurisdiction microwave backbone.

Although historically the various jurisdictions and agencies in this region have developed and operated independent radio systems, several jurisdictions have partnered to create a regional microwave system including Carroll County, Pulaski County, Grayson County and the City of Galax.

Most voice radio systems in Region 4 are conventional UHF, VHF, or Lo-Band.

Several jurisdictions in this region face operability challenges including old equipment and lack of coverage as well as terrain challenges that force the use of lower frequencies. They also face funding challenges which encourages the use of lower frequencies because fewer towers reduce infrastructure cost. Some of these jurisdictions are using PSIC grants to improve operability; however, additional improvements are needed.

The City of Bristol operates an 800 MHz Motorola trunked system which presents voice interoperability issues. Bristol acts as a 9-1-1 rollover center, but the fact that they have an incompatible radio system prevents them from performing radio dispatch functions. Meeting participants noted that this issue still needs to be addressed.

The participants also noted a lack of interoperability across state lines which impacts interstate operations including vehicle pursuits.

Region 4 is not part of a COMLINC project; therefore, other methods are used to provide communications between local and state police. RPAC-I meeting participants noted that, although some counties use the State Interdepartmental Radio System (SIRS), not all counties in the region use the channel for communications between local law enforcement and VSP. Some local agencies give a radio to VSP troopers and occasionally they use their personal cell phones when other methods of communication are unreliable or unavailable.

The following summarizes select voice projects that are in progress:

Table 9: Voice Projects in Progress

Project Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Regional Digital Microwave System (PSIC grant)	Digital microwave infrastructure and P25 compliant radios. Includes Carroll County, Pulaski County, Grayson County, City of Galax.	V1, V2
Smyth County System	Building a VHF radio system to improve portable coverage in Smyth County and assist Tazewell County by covering SW portion of the county.	V1, V2
Pulaski and Carroll County	PSIC grant to provide radio communications between Pulaski and Carroll County via repeaters and UHF/VHF VOTER system	V2
Tazwell County (PSIC)	PSIC grant to replace field radios with increased channel capabilities for both on-scene incidents and intra/inter agency communications	V1, V2
Scott County	Installing interoperability radio at the ECC which uses interoperability frequencies	V2
OEMS radios	OEMS providing radios to rescue squads for interoperability capabilities	V2

The following table summarizes voice projects that are in the planning phase.

Table 10: Planned Voice Projects

Planned Project	Description (system info, users, problem areas, etc)	Capability Addressed
Washington County Command Van Upgrade	Radio Cache, patching, satellite telephones	V4-6

Participants noted that additional radio cache resources are needed.

Although voice interoperability has been the focus in this region (and across the state), there are also various important data applications that support emergency services. The meeting participants identified current and planned projects and data capabilities for the region.

The following summarizes current and planned data projects:

Current Data Projects

- Capital Wireless Information Net (CapWIN)
    - Law enforcement officers in the City of Galax use the CapWIN, which is a partnership between the State of Maryland, the Commonwealth of Virginia, and the District of Columbia. Officers access CapWIN using aircards and a commercial wireless data service ($50/month, unlimited).

- VITA/Northrop Grumman partnership – statewide IP network
    - Data Center is located in Russell County (the other is located in Chesterfield County)

- Commercial Tier III data center in Duffield, VA (Scott County)
    - OnePartner, LLC, is providing commercial data center services (including collocation and disaster recovery)
    - Fiber connectivity available via different Telcos

Planned data projects

- Grayson County – New CAD will be connected to regional dispatch center
- Norton, Dickenson and Wise County applied for Virginia Department of Criminal Justice Services (DCJS) grant for records management.
- Under consideration -- Southwest Hosted PSAP Pilot (info not from RPAC-I meeting)
    - Joint venture between Wise County, Dickenson County and the City of Norton
    - Hosted 9-1-1 Customer Premise Equipment and potential CAD
    - Utilizes Northrop Grumman data centers; however, localities may opt for local solution
    - Provide connectivity to statewide IP network
    - Supports Next Generation 911 technologies
    - Supports information sharing

Region 5: Tidewater
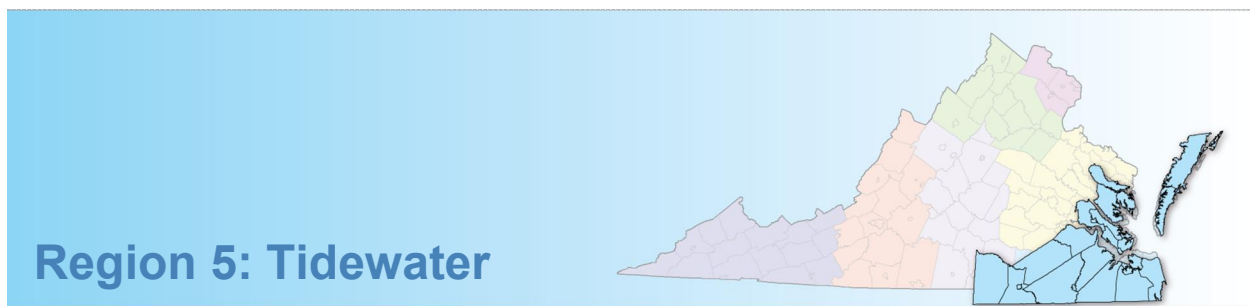
Region 5 includes Hampton Roads which is designated as an Urban Area Security Initiative (UASI) region. The region is supported by advanced technology, especially in the jurisdictions that surround the harbor area of Hampton Roads. 800 MHz trunked radio systems are prevalent in this area. As you move outside of the Hampton Roads area, radio systems are more likely to be UHF or VHF conventional.

Several major systems and technologies distinguish the Hampton Roads region:

- Hampton Roads Tactical Regional Area Network (HRTacRAN) – regional digital microwave system (voice and data)
- Overlay Regional Interoperability Network (ORION) – regional 700 MHz voice radio overlay; 900 MHz mobile data system
- Multiple 800 MHz Trunked Radio Systems
- Interoperability Gateways and VoIP capability
- Radio Caches
- Shared Trunked Radio Systems

The Hampton Roads Tactical Regional Area Network (HRTacRAN) is a regional microwave network that supports ORION and also provides voice and data communications in the Hampton Roads region. It provides teleconferencing and other collaboration between local EOCs. A microwave link has also been established to the State EOC and WHRO, the local public television and radio broadcast network. The Coast Guard has a connection to HRTacRAN.

Overlay Regional Interoperability Network (ORION) is a multi-jurisdictional 700 MHz P25 radio system. It does not act as a primary system for any one jurisdiction, but rather provides a mutual-aid overlay across multiple jurisdictions including the Cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, Suffolk and Virginia Beach. ORION also provides a mobile data capability through the use of a 900 MHz system.

The City of Chesapeake and City of Hampton were awarded a grant to establish a strategic radio cache. To ensure quick response and availability, the radio cache will be split between Chesapeake and Hampton in order to cover the north and south side of the James River. This cache is available as a statewide resource. Other caches exist in the region as local or regional resources.

The County of York and James City County have created a shared 800 MHz Motorola trunked radio system that serves those two counties plus the City of Williamsburg, National Park Service, College of William and Mary, and Kingsmill Police. Currently, the system is being expanded to include the County of Gloucester.

The following table identifies select voice radio systems and resources available in Region 5, particularly those that support regional interoperability:

Table 11: Current Voice Systems and Resources

Regional System or Resource Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Overlay Regional InterOperability Network (ORION)	Multi-jurisdictional 700 MHz P25 Motorola radio system currently covering 7 jurisdictions.	V2
HR TacRAN	Regional digital microwave system installed throughout the Hampton Roads region supporting voice, data, and video. The system also acts as the backbone for ORION and a network of interoperability gateways (ACU-1000s).	Supports V1-2, V9, V4-6 (via COMLINC). Supports collaborative applications including voice and data
York/James City County System	800 MHz P25 Motorola Trunked radio system covering York County, James City County, City of Williamsburg, National Park Service, College of William and Mary, and Kingsmill Police.	V1-2
Strategic Radio Cache	City of Chesapeake (lead agency) and City of Hampton were awarded a grant to establish a strategic radio cache.	V4-6
NPSPAC 800 MHz Interop Channels	Several Hampton Roads jurisdictions have implemented national 800 MHz interoperability channels.	V4-6, V7 (may not be actively monitored in all locations by dispatch center)
Federal Interoperability Channel	Wide area VHF channel used by Federal agencies. Local and state agencies can link to agencies on the federal interoperability channel using control stations or patch.	V4-6, V10
Hospital VHF Channels	Hospital-to-hospital and hospital-to-ambulance	V1, V2
VoIP Gateways (COMLINC)	A network of Raytheon ACU-1000 gateways connected through the HR TacRAN backbone.	V2
STARS	Working in Region 1 and Region 5. Radio Cache available from SPHQ (150-200 radios plus command post)	V1

COMLINC capability has been provided for some of the jurisdictions through the use of Raytheon ACU-1000 technology; however, SIRS is still used for communications with Virginia State Police. Some agencies have the ability to patch local channels to SIRS. There are plans to add VSP as an ORION voice radio system user. There are also plans to add Virginia Department of Transportation (VDOT) smart traffic centers to the ORION system to allow for local responder communications with VDOT.

The following table summarizes select voice projects that are in progress:

Table 12: Voice Projects in Progress

Project Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Adding County of Gloucester to York/James City County system	Expanding this Motorola P25 800 MHz trunked shared system to include Gloucester County	V1, V2
Isle of Wight County	Adding VTAC and VCALL to issued radios	V2, V7
VDOT STARS upgrade	Upgrading safety patrol vehicles with 800 MHz STARS radios. Currently use VHF and Nextel. Voice communications currently relayed through dispatch.	V2
Hospital-to-hospital 150 MHz System		V2
Migration of legacy analog 800 MHz trunked systems to standards based systems	Several jurisdictions are in the process of migrating their analog 800 MHz infrastructure and subscribers to the P25 suite of standards .	V1, V2

The following table summarizes voice projects that are in the planning phase.

Table 13: Planned Voice Projects

Planned Project	Description (system info, users, problem areas, etc)	Capability Addressed
ORION expansion	Expand coverage to additional localities and areas in the region not currently covered by ORION. Reviewing sites currently.	V2
HRTacRAN expansion	Expand into outlying localities	Supports V1-2, V9, V4-6 (via COMLINC). Supports collaborative applications including voice and data
Federal IO Channel Expansion	Working with FBI Norfolk field office to expand Federal Interoperability channel coverage	V2, V4

Although voice interoperability has been a key focus in this region, there are various important data systems, services and applications supporting emergency services. The meeting participants identified numerous current and planned projects and data capabilities for the region.

The following summarizes current and planned data projects and needs:

Current Data Projects

- WebEOC
    - Common application supporting EOCs and Hospitals
        - Regional WebEOC server in progress
- VITA orthophotography program
    - Provides statewide aerial imagery to each jurisdiction. Can provide common base map background.
- Road Center Line Project
    - ISP coordinates a statewide seamless road center line project that tracks road change reported by jurisdictions and VDOT. Can be provided as GIS layer.
- Emergency Management Network (EMNet)
    - Uses HRTacRAN
- VDOT Regional Transportation System Management Information System (RTSMIS).
    - Allows Hampton Roads cities to share info/data
    - Will be able to communicate directly with Traffic Management Control
- Police Law Enforcement Information Exchange (LiNX)
    - Currently in Richmond Hampton Roads, Virginia Beach, Norfolk, NCR
    - Housed in Navy Yard in DC and eventually will mesh data
- VITA/Northrop Grumman partnership – statewide IP network
    - Data Centers are located in Russell County and Chesterfield County
   - This region uses HRTacRAN for public safety applications

Planned data projects

- WebEOC planned in several jurisdictions
- CAD Interoperability
    - York County noted a planned project supported by a CAD data exchange grant
    - VDOT noted coordination with area jurisdiction for TIS-IN with RTSMIS which will allow HR cities to share info/data in CAD format since that is what VSP uses. Two cities are complete and two more are expected by the end of August.

Data needs

- GIS/mapping data interoperability
    - Meeting participants discussed the need to identify common shared GIS mapping data across multiple agencies including VSP, VDEM, VITA, etc. It was noted that the Governor chose VSP; therefore, VITA has adopted it.
- CAD Interoperability
    - Currently manual mutual aid

Region 6: Roanoke
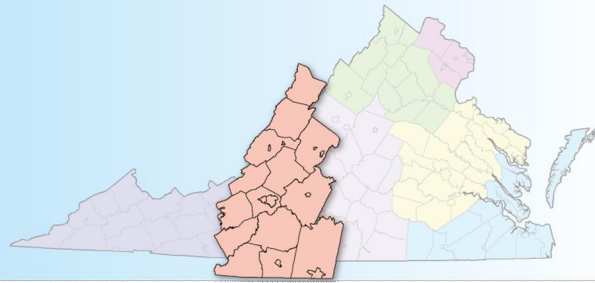
Region 6 is diverse with regard to the level of technology present in each jurisdiction. Systems vary from basic to advanced. Jurisdictions are focused on a wide range of needs including voice operability, voice interoperability, information sharing, and information access.

There are a couple of shared 800 MHz trunked systems in Region 6.

The City and County of Bedford are part of a shared M/A-COM Enhanced Digital Access Communications System (EDACS) 800 MHz trunked system that also supports the County of Amherst and the City of Lynchburg.

Roanoke County and Roanoke City are on a shared Motorola 800 MHz system. They are in the process of transitioning this system from analog to digital P25.

Most voice radio systems outside of the urban areas mentioned above are conventional VHF or UHF. Some communities are striving to improve operability as well as interoperability; for example, Henry County is upgrading their current analog radio system to a VHF simulcast system.

The importance of regional mutual aid channels was noted. The meeting participants identified a priority need for base stations supporting national interoperability channels.

The State Interdepartmental Radio System (SIRS) channel is available for law enforcement mutual aid; however, participants also noted that the Commonwealth's Link to Interoperable Communications (COMLINC) project is in progress in some counties. Providing local radios to state troopers was another method identified to provide interoperability with VSP.

The HEAR system (which operates on VHF) is available for hospital-to-hospital and EMS-to-hospital communications.

The following are some select voice radio systems and resources available in Region 6, particularly those that support regional interoperability:

Table 14: Current Voice Systems and Resources

Regional Systems and Resources	Description (system info, users, problem areas, etc)	Capabilities Addressed
Central Planning District System	M/A-COM (EDACS) 800 MHz trunked radio system that supports multiple jurisdictions including City of Lynchburg, City of Bedford, County of Bedford and County of Amherst.	V1, V2
Roanoke City / Roanoke County	800 MHz Motorola trunked system that supports Roanoke County and Roanoke City. System being transitioned to P25	V1, V2
SIRS	Statewide law enforcement mutual aid system	V3
HEAR	Hospital-to-hospital and EMS-to-hospital communications. Finding strengths and weaknesses to meet narrowband requirement.	V1, V2
COMLINC (Cisco)	COMLINC capability being provided to the City of Danville, Pittsylvania County, VSP and jurisdictions across the North Carolina border using Cisco IPICS technology	V2, V3

Some jurisdictions in Region 6 and Region 3 are part of a COMLINC project that involves installing voice-over-IP (VoIP) bridging technology. COMLINC can provide radio bridging local-to-local and local-to-state. This regional VoIP project will use SyTech RIOS technology and a common IP backbone network. Some participants shared concerns that COMLINC may not achieve all interoperability needs.

The City of Danville and County of Pittsylvania are part of a pilot project called the Piedmont Valley Voice over IP Pilot project that also involves the Virginia State Police, The North Carolina State Highway Patrol, and Caswell County, North Carolina. The project provides a VoIP radio bridging capability using Cisco's IP Interoperability and Collaboration System (IPICS) and a common IP backbone.

The following summarizes select voice projects that are in progress:

Table 15: Voice Projects in Progress

Project Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
COMLINC (SyTech)	COMLINC using SyTech technology (VoIP) covers some jurisdictions in Region 6 and Region 3. COMLINC supports bridging between local systems. Can also support bridging between locals and state police (STARS). Subscriber units constrained to local system coverage (i.e., they cannot roam outside of their home coverage area).	V2, V3
Henry County System	PSIC grant funding will be used to migrate Henry County's current analog system to a 4-tower simulcast VHF system.	V1
City of Radford	Replacement of current consoles with digital P25 capabilities	V1
HEAR	Upgrading HEAR system within PCIS project. Also enhancing existing Ham radio w/ packet capabilities	V1, V2

Although voice interoperability has been the focus in this region (and across the state), there are various important data applications that support emergency services. The meeting participants identified some current and planned projects and data capabilities for the region.

The following summarizes current and planned data projects and needs:

Current Data Projects

- State managed WebEOC used by several counties
- Healthcare
    - Winlink 2000 (email and messaging via amateur radio)
    - Internet WebEOC resource availability, patient tracking, health and welfare messages
    - The Virginia Hospital & Healthcare Association (VHHA) operates a web site that shares critical emergency management information needed by Virginia hospitals and healthcare providers (e.g., surge capabilities, bed availability, supplies).
- VITA/Northrop Grumman partnership – statewide IP backbone
- IFLOWS in multiple counties
- Some mobile data capabilities are available
- Reverse 911 grant – Martinsville/Henry County/Radford
- 911 Center Connectivity
    - Franklin/Patrick/Martinsville/Henry County are connecting 911 centers through an IP backbone
- Police Law Enforcement Information Exchange (LiNX)
    - Martinsville and Danville
    - Housed in Navy Yard in Washington DC
- Franklin upgrading CAD to include WebEOC (mapping upgrade)

Data needs

- First Responder Authentication Card (FRAC) – funding sources and credentialing issues noted with regard to Virginia Department of Fire Programs (VDFP)

Region 7: Northern Virginia
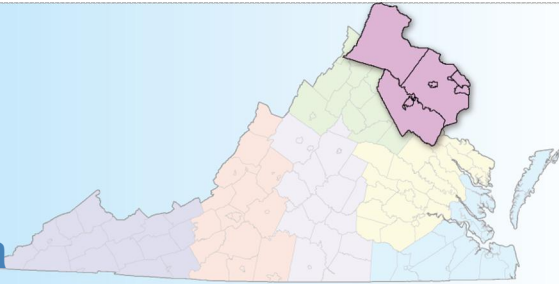
The Northern Virginia region (Region 7) is characterized by advanced capabilities with regard to voice interoperability. This region has been actively addressing interoperability since 1982 due to the momentum created in the wake of the Air Florida tragedy.

All jurisdictions in Region 7 are part of the National Capital Region (NCR) which is designated as an Urban Area Security Initiative (UASI) region. Region 7 is supported by advanced technology including voice, video, and IT infrastructure.

All counties and cities in Region 7 operate 800 MHz Motorola trunked radio systems. These counties along with others in the NCR actively coordinate through the Metropolitan-Washington Council of Governments (COG) which, along with local planning, has resulted in the ability of all local responders to be able to access neighboring systems. This is complemented by radio caches, transportable communications, regional mutual aid channels, and patching capabilities that provides interoperability with federal agencies and outside mutual aid responders from outside the Commonwealth.

Several systems, technologies, projects, and resources distinguish the Northern Virginia region, including the following:

- NCR Radio Cache: 800 MHz radio cache that supports the NCR only
- Strategic Radio Cache: 230 radios and supporting equipment and personnel available for statewide deployment
- Cross programming of 800 MHz radio systems in the region
- Regional Fiber network
- Data Exchange Hub

The following table identifies select voice radio systems and resources available in Region 7, particularly those that support regional interoperability:

Table 16: Current Voice Systems and Resources

Regional System or Resource Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Motorola 800 MHz Trunked Radio Systems	Regional interoperability between Motorola 800 MHz radio systems. Interoperability possible through cross-programming, common talkgroups and common nomenclature.	V1, V2
NCR Radio Cache	800 MHz radio cache that supports the NCR only. Includes transport, support staff, and other supporting technology	V4-6
Statewide Strategic Radio Cache	Strategic radio cache located in Fairfax County and available for statewide deployment. Includes 330 portables including a mix of M/A-COM and Motorola radios and support staff.	V4-6
City of Alexandria gateways	Fixed ACU-1000 gateway system located in Alexandria that includes local, state, and federal frequencies.	V4-6
PMARS/FMARS	Police Mutual Aid Radio system; Fire Mutual Aid Radio System – provide communications between dispatch centers	V2
Hospital VHF Channels	Hospital-to-hospital and hospital-to-ambulance	V1, V2
Interoperability Channels	FCC Region 20 has 5 repeated interoperability channels in use by Region 7	V4-7
Arlington County	Arlington County recently installed aP25 800 MHz system	V1, V2
NPSPAC 800 MHz Interoperability Channels	All of region 7 has implemented national 800 MHz interoperability channels	V4-7
Satellite Communication	Portable satellite phones programmed with state talkgroups, national smart talkgroups and NCR talkgroups	V9

The following table summarizes select voice projects that are in progress:

Table 17: Voice Projects in Progress

Project Name	Description (system info, users, problem areas, etc)	Capabilities Addressed
Fairfax County	800 MHz P25 radio upgrade in progress	V1, V2
WMATA	Upgrade of communications system to interact with public safety community	V1, V2

This region has been successful at addressing voice interoperability; therefore, a natural focus area is the development of interoperability between important data systems, services and applications supporting emergency services.

The following summarizes current and planned data projects and needs:

Current Data Projects

- All jurisdictions within Region 7 are supported with:
    - Basic mobile data access
    - Emergency Management Network (EMNet)
    - A "211" number which public safety officials and citizens can call for information
    - Video Teleconferencing (VTC) from local to local and local to State
    - Standardized EMS & Fire reporting
    - Automated Fingerprint Identification System (AFIS)
    - Virtual Joint Information Center (VJIC) for Public Information Officers (PIOs)
- Data Exchange Hub (DEH) allows government agencies and organizations across the region can use to share critical data and information during an emergency and during day to day operations; this includes CAD interoperability (funded by PSIC grant)
- Institutional Networks (INET) is a shared government institutional fiber network covering multiple jurisdictions in the NCR
- VITA/Northrop Grumman partnership – statewide IP network
    - Data Centers are located in Russell County and Chesterfield County
- WebEOC is a common application implemented throughout the region
    - Views into neighboring WebEOC instances
- Police Law Enforcement Information Exchange (LiNX)
    - Housed in Navy Yard in DC and eventually will mesh data

Planned data projects

- CAD Interoperability for Region 7 (funded by PSIC grant)
- Virginia Hospital Alliance (VHA) wants to share status of Emergency Room beds
- VDOT and VSP want to share incident information on roadways
- Regional sharing of core GIS information
- Standards based message structure (more specifically Common Operating Picture information)

Data needs

- CAD Interoperability

Graphical Analysis

Several graphics have been developed to provide information about the geographic location of communications systems and assets in Virginia. By representing the information in a geographic view, a more complete picture of the current state is provided, enabling recognition of connections, patterns, and relationships that are not easily evident from text-only information. These graphics provide a high-level snapshot of radio cache resources, shared 800 MHz trunked radio systems, and areas covered by COMLINC projects.

Radio Cache

Figure 6 provides a geographical representation of the location of radio cache assets throughout the Commonwealth. The graphic shows local radio cache resources, but more importantly, statewide deployable radio caches. This graphic can be found in Appendix C as a larger image.
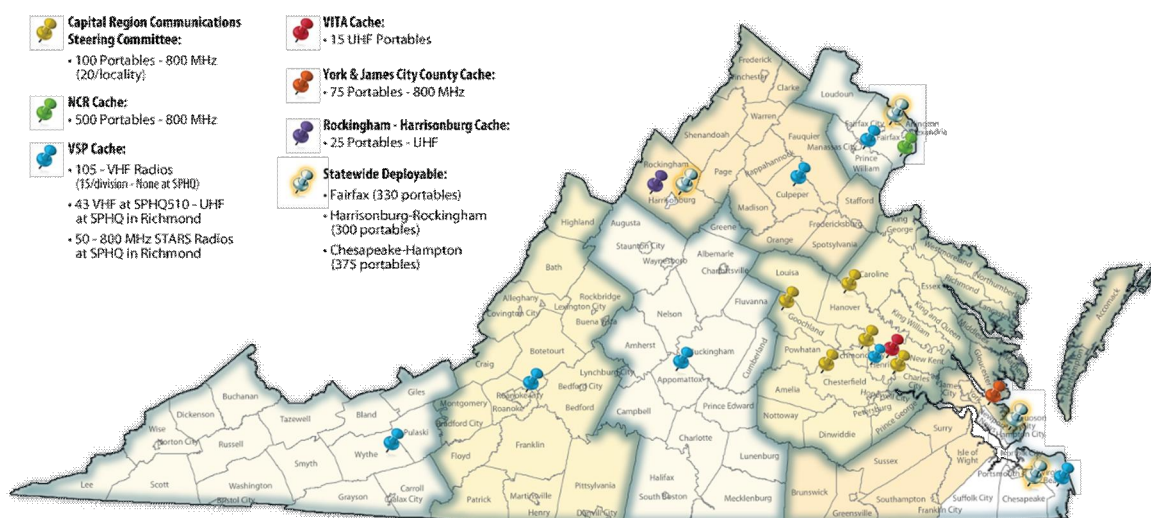

Figure 6: Radio Cache

800 MHz Trunked Radio Systems

Figure 7 provides the location of shared 800 MHz trunked radio systems. It also shows the location of 800 MHz trunked systems that are not shared. The graphic can help by identifying the location of shared systems that provide a high level of interoperability to local responders. It also shows the diversity of M/A-COM and Motorola systems across the Commonwealth. All systems shown are 800 MHz systems with the exception of the ORION overlay in the Hampton Roads region which uses 700 MHz spectrum. This graphic can be found in Appendix D as a larger image.
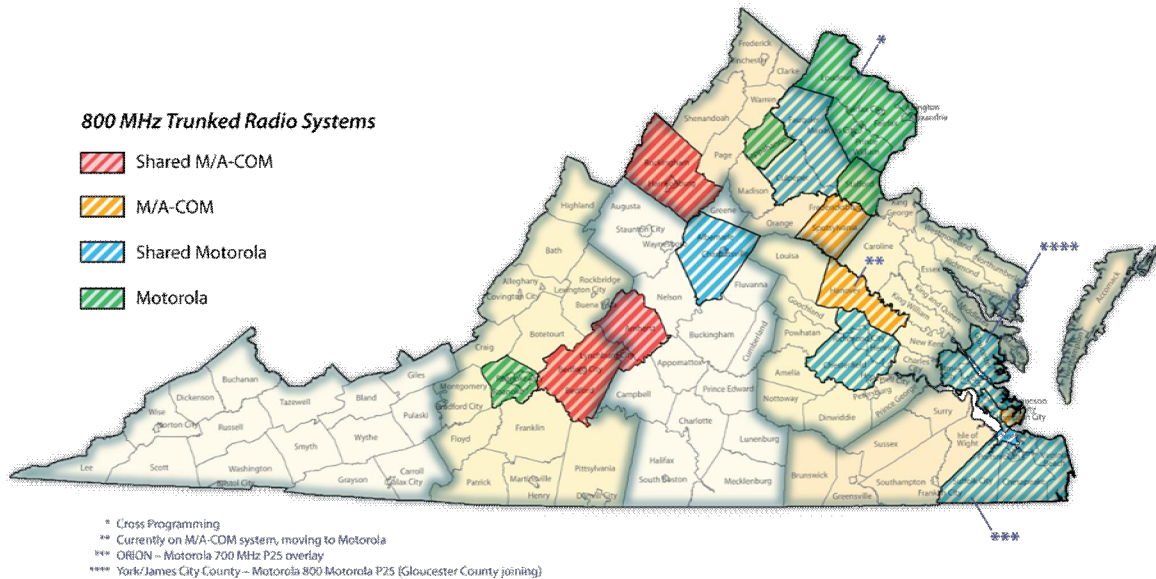
Figure 7: 800 MHz trunked radio systems

COMLINC

Figure 8 shows existing or planned projects that are intended to provide a radio channel bridging capability over a wide geographic area using VoIP technology. This particular graphic highlights the diversity of technologies and manufacturers chosen for use in these projects. The graphic also shows how projects may involve more than one RPAC region. The shaded areas of this graphic do not necessarily represent locations that have successfully implemented a COMLINC capability; rather they represent locations targeted for COMLINC installation. The ability of these implementations to achieve intended objectives would require additional analysis. This graphic can be found in Appendix E as a larger image.
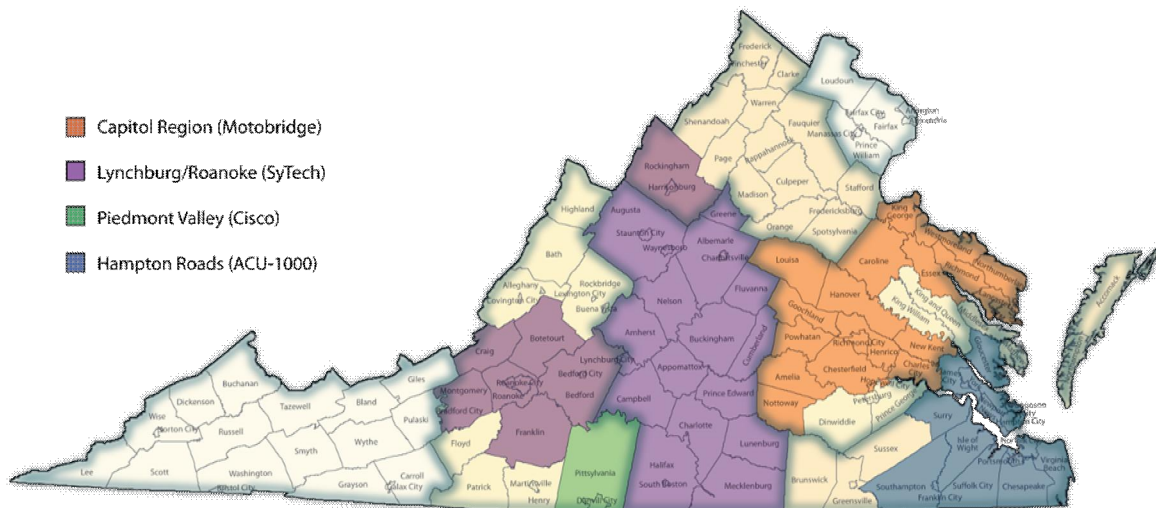

Figure 8: COMLINC

3   Next Steps and Conclusion

The Tech Plan Blueprint will support the development of a statewide Tech Plan. It consolidates and summarizes data on technical activities occurring across the Commonwealth, identifies the current state of technology for each region, identifies current technical approaches, and reflects how each region has prioritized its resources. This information can support the SIEC as it develops a unified Tech Plan; this information can also propel the update of the Commonwealth's strategy and initiatives for upcoming years, and allocate resources for improving communications interoperability for Virginia's emergency response community.

3.1   Objectives of the Tech Plan Blueprint

This data, in addition to active discussions with the RPAC-Is, will be useful to the CICO and the SIEC in supporting the creation of a common operating picture of the current state across Virginia. With a consolidated snapshot of activities across the Commonwealth, a more directed and focused Statewide Plan will link efforts across different regions and localities to address communications interoperability gaps.

Objectively reviewing the data in the Tech Plan Blueprint and brainstorming creative solutions will lead to a long-term roadmap for Virginia's future technical development. In the near-term, the Tech Plan Blueprint will identify opportunities where cross-regional activities can be mutually beneficial or combined for greater efficiency. This will lead to more efficient resource allocation and collaboration from planning through implementation phases among all of Virginia's system planners and emergency response practitioners as they tackle the various phases from planning to implementation.

Finally, the data in this Tech Plan Blueprint can serve as a reference document for system planners and technical advisors in any region or locality. By applying their technical knowledge and building collaborative relationships, they can use the summary data to anticipate potential roadblocks or barriers in the event that two localities or regions are embarking on conflicting technical approaches.

3.2   Moving from Blueprint to a Detailed Tech Plan

The Tech Plan Blueprint will be shared with the SIEC's Technical Standing Subcommittee in September 2008. The Technical Standing Subcommittee may conduct its own review and validation of the common trends and themes pulled from the regional focus group data. The Technical Standing Subcommittee can begin to develop a more detailed version of the Tech Plan by building upon on the high-level information contained in the Tech Plan Blueprint and infusing its historical knowledge of what will work in the Commonwealth and what will be challenging.

The Tech Plan will begin the process of identifying guidance, solutions, and best practices for addressing the most common regional gaps and coordinating resources and projects. The SIEC Technical Standing Subcommittee can reference the following process to develop the detailed Tech Plan:
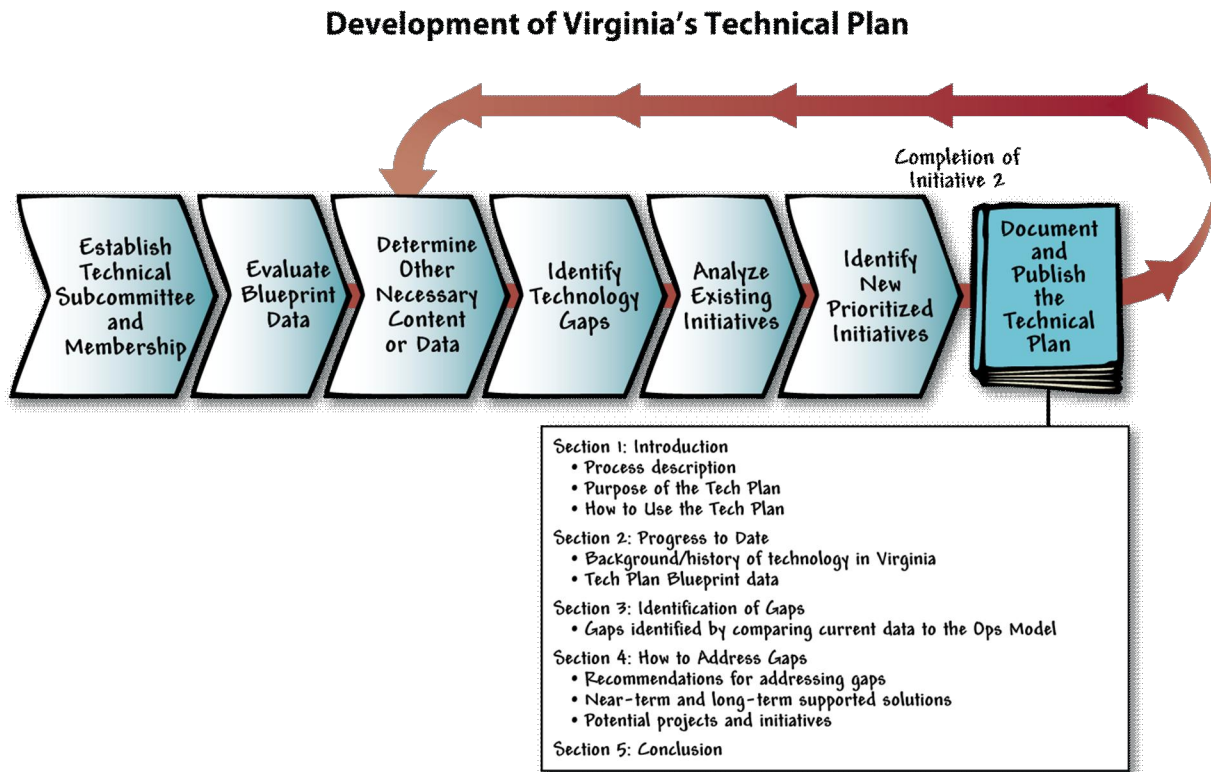
Development of Virginia's Technical Plan

Figure 9: Development of Virginia's Technical Plan

1. Establish Technical Standing Subcommittee and Membership

At the next SIEC meeting, members will self-select one of the three standing subcommittees (Technical, Operations and Policy). After this selection occurs, the Technical Standing Subcommittee can begin outlining a clear schedule and course of action for the development of the Tech Plan. Once the subcommittee is launched, it will be important to retain a group focus on immediate objectives that will enable effective results. Additionally, an important task in this step will be to identify stakeholders and perspectives missing from the Technical Standing Subcommittee so that those can be included in the development of the Tech Plan.

2. Evaluate Blueprint Data

The Technical Standing Subcommittee can review and validate the common trends and themes pulled from the regional focus group data included in this Blueprint. This will allow the Technical Standing Subcommittee members to accurately assimilate and consider data covering the entire Commonwealth which will help to develop a more complete picture with a statewide perspective. If points requiring clarification emerge, the Technical Standing Subcommittee members may call upon the stakeholders from the RPAC-Is to provide additional input or updates.

3. Determine Other Necessary Content or Data

This phase of the process allows the Technical Standing Subcommittee to evaluate the completeness of the data available in the blueprint and identify additional content necessary for the Technical Plan. The Technical Standing Subcommittee can reach out to stakeholders to determine if other information should be included in the detailed Tech Plan.

This will include requesting information to fill data gaps or better understand the requirements driving a locality's system design or technical decisions.

4. Identify Technology Gaps

Common trends in technology and current challenges have been identified throughout this Tech Plan Blueprint. This data can be used to identify and prioritize technology gaps and initiatives and support the targeting of future grant funding to address such issues.

5. Analyze Existing Initiatives

The Technical Standing Subcommittee should review how the existing initiatives address capabilities identified in the Ops Model to ensure that these initiatives appropriately serve the goals of the Commonwealth.

6. Identify New Prioritized Initiatives

Throughout the development of this Tech Plan Blueprint, an extensive list of projects and priorities of stakeholders in the seven regions was identified. This list can be used to determine the best way to address the gaps identified through further research while ensuring the projects and priorities align with the Ops Model. (Note: this phase is where SIEC members would look at existing initiatives and determine what new initiatives are necessary to meet the goals identified in the Ops Model)

7. Document and Publish the Technical Plan

The data analysis performed by the Technical Standing Subcommittee will result in a statewide technical approach and a consolidated set of priorities for Virginia. It will be important for broad-based practitioner buy-in and support to create a shared awareness of the content of the Tech Plan. A simple, concise format for the Tech Plan will be important to ensuring accessibility of the content for a diverse audience.

Technical Plan Outline

Section 1: Introduction

- Process description
- Purpose of the Tech Plan
- How to Use the Tech Plan

Section 2: Progress to Date

- Background/history of technology in Virginia
- Tech Plan Blueprint data

Section 3: Identification of Gaps

- Gaps identified by comparing current Blueprint data to the Ops Model
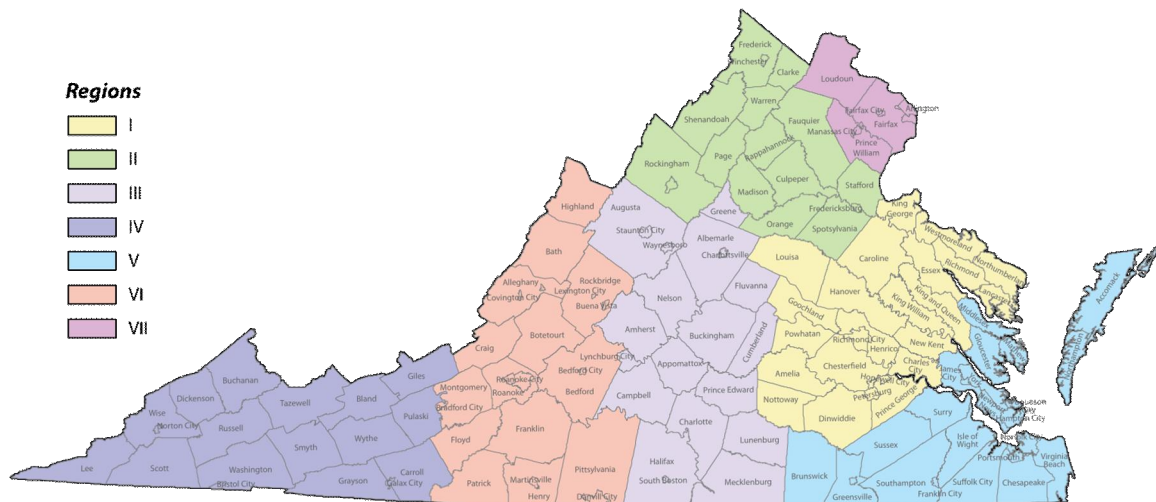
Section 4: How to Address Gaps

- Recommendations for addressing gaps
- Near-term and long-term supported solutions
- Potential projects and initiatives

Section 5: Conclusion

4   Appendix A: Cities and Counties in Seven Planning Regions

Regional Preparedness Advisory Committees (RPAC)

Region 1: Richmond

- Amelia County
- Caroline County
- Charles City County
- Chesterfield County
- City of Colonial Heights
- Dinwiddie County
- Essex County
- Goochland County
- Hanover County
- Henrico County
- City of Hopewell
- King and Queen County
- King George County

- King William County
- Lancaster County
- Louisa County
- New Kent County
- Northumberland County
- Nottoway County
- City of Petersburg
- Powhatan County
- Prince George County
- Richmond County
- City of Richmond
- Westmoreland County

Region 2: Culpeper

- Clarke County
- Culpeper County
- Fauquier County
- Frederick County
- City of Fredericksburg
- City of Harrisonburg
- Madison County
- Orange County

- Page County
- Rappahannock County
- Rockingham County
- Shenandoah County
- Spotsylvania County
- Stafford County
- Warren County
- City of Winchester

Region 3: Central Virginia

- Albemarle County
- Amherst County
- Appomattox County
- Augusta County
- Buckingham County
- Campbell County
- Charlotte County
- City of Charlottesville
- Cumberland County
- Fluvanna County
- Greene County
- Halifax County
- Lunenburg County
- City of Lynchburg
- Mecklenburg County
- Nelson County
- Prince Edward County
- City of South Boston
- City of Staunton
- City of Waynesboro

Region 4: Southwest

- Bland County
- City of Bristol
- Buchanan County
- Carroll County
- Dickenson County
- City of Galax
- Giles County
- Grayson County
- Lee County
- City of Norton
- Pulaski County
- Russell County
- Scott County
- Smyth County
- Tazewell County
- Washington County
- Wise County
- Wythe County

Region 5: Tidewater

- Accomack County
- Brunswick County
- City of Chesapeake
- City of Emporia
- City of Franklin
- Gloucester County
- Greensville County
- City of Hampton
- Isle of Wight County
- James City County
- Mathews County
- Middlesex County
- City of Newport News
- City of Norfolk
- Northampton County
- City of Poquoson
- City of Portsmouth
- Southampton County
- City of Suffolk
- Surry County
- Sussex County
- City of Virginia Beach
- City of Williamsburg
- York County

Region 6: Roanoke

- Alleghany County
- Bath County
- Bedford County
- City of Bedford
- Botetourt County
- City of Buena Vista
- City of Covington
- Craig County
- City of Danville
- Floyd County
- Franklin County
- Henry County
- Highland County
- City of Lexington
- City of Martinsville
- Montgomery County
- Patrick County
- Pittsylvania County
- City of Radford
- Roanoke County
- City of Roanoke
- Rockbridge County
- City of Salem

Region 7: Northern Virginia

- Arlington County
- City of Alexandria
- City of Fairfax
- Fairfax County
- City of Falls Church
- Loudoun County
- City of Manassas
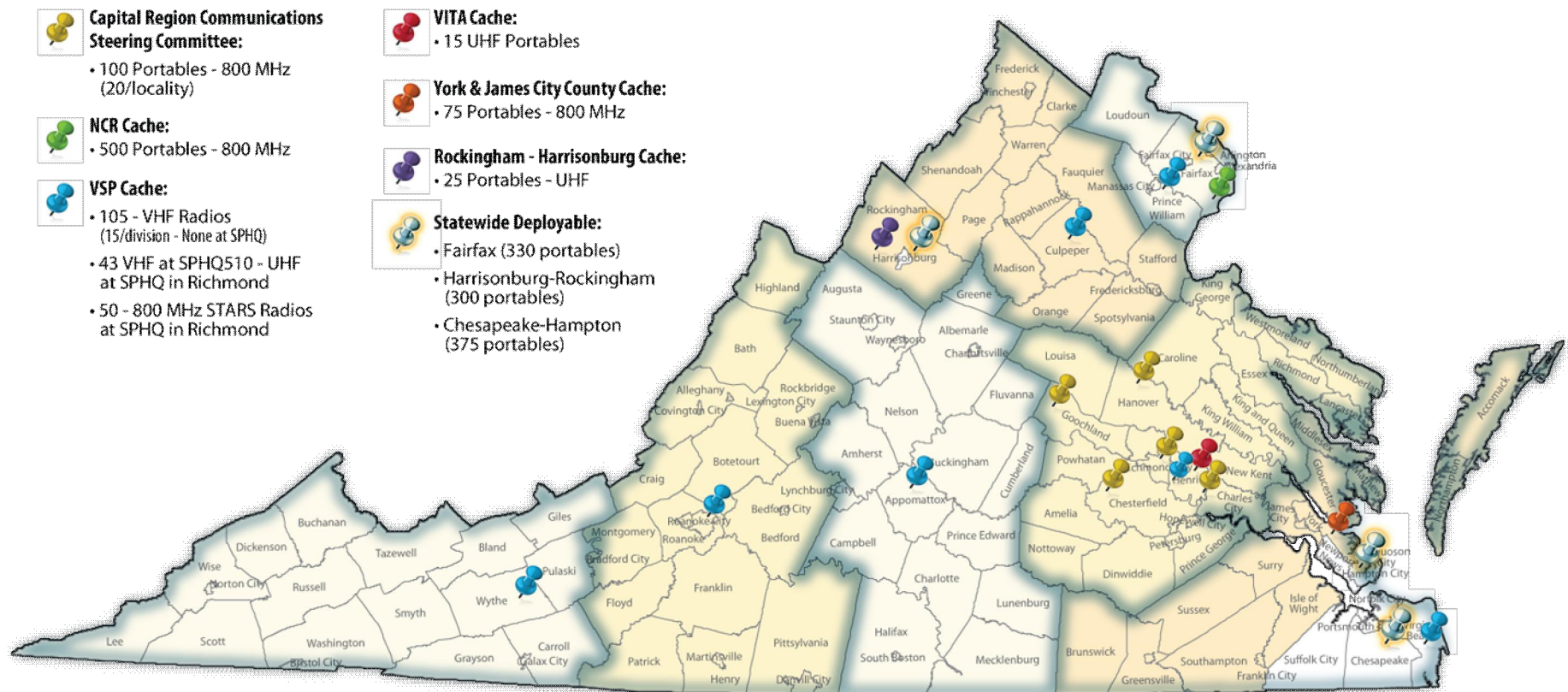- City of Manassas Park
- Prince William County

5 Appendix B: NIMS: Five Levels of Complexities

Incidents may be typed in order to make decisions about resource requirements. Incident types
are based on the following five levels of complexity. (Source: U S. Fire Administration)
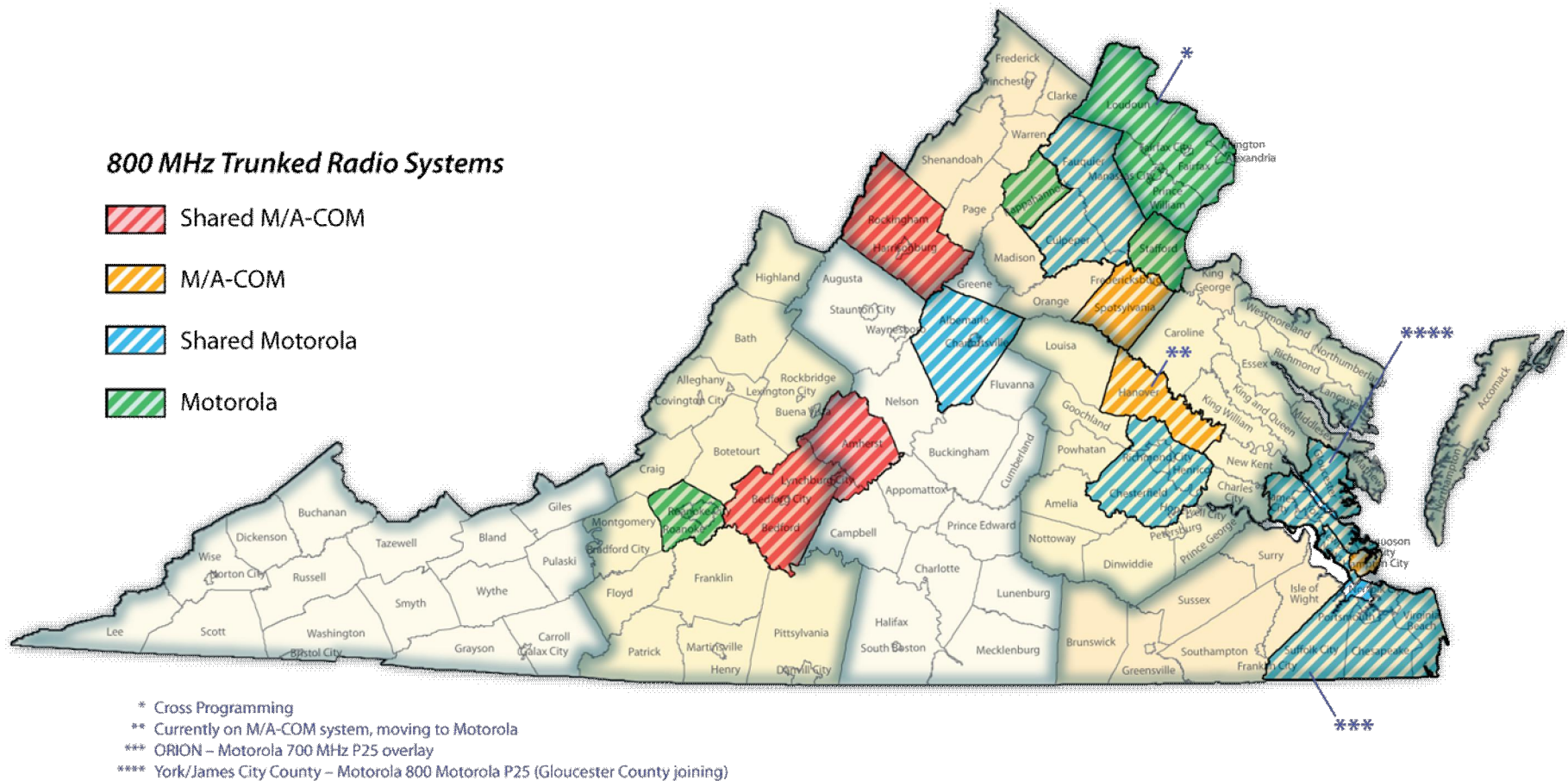
Type 5	- The incident can be handled with one or two single resources with up to six personnel. - Command and General Staff positions (other than the Incident Commander) are not activated - No written Incident Action Plan (IAP) is required. - The incident is typically contained within an hour or two after resources arrive on scene. - Examples include a vehicle fire, an injured person, or a police traffic stop.
Type 4	- Command Staff and General Staff functions are activated only if needed. - Several resources are required to mitigate the incident, possibly including Task Forces or Strike Teams. - The incident is typically contained within one operational period in the control phase, usually within a few hours after resources arrive on scene. - The Agency Administrator may have briefings, and ensure the complexity analysis and delegation of authority are updated. - No written IAP is required but a documented operational briefing will be completed for all incoming resources - Examples may include a major structure fire, a multiple vehicle crash with multiple patients, an armed robbery, or a small hazmat spill.
Type 3	When capabilities exceed initial attack, the appropriate ICS positions should be added to match the complexity of the incident. - Some or all of the Command and General Staff positions may be activated, as well as Division/Group Supervisor and/or Unit Leader level positions. - A Type 3 Incident Management Team (IMT) or incident command organization manages initial action incidents with a significant number of resources, an extended attack incident until containment/control is achieved, or an expanding incident until transition to a Type 1 or Type 2 team. - The incident typically extends into multiple operational periods - A written IAP is typically required for each operational period. - Examples include a tornado touchdown, earthquake, flood, or multi-day hostage stand-off situation.

Type 2	This type of incident extends beyond the capabilities for local control and is expected to go into multiple operational periods. A Type 2 incident may require the response of resources out of area, including regional and/or national resources, to effectively manage the operations.
	▪ Most or all of the Command and General Staff positions are filled.
	▪ A written IAP is required for each operational period.
	▪ Many of the functional units are needed and staffed.
	▪ Operations personnel normally do not exceed 200 per operational period and total incident personnel do not exceed 500 (guidelines only).
	▪ The Agency Administrator is responsible for the incident complexity analysis, Agency Administrator briefings, and the written delegation of authority
	▪ Typically involve incidents of national significance.
Type 1	This type of incident is the most complex, requiring national resources to safely and This type of incident is the most complex, requiring national resources to safely and effectively manage and operate
	▪ All Command and General Staff positions are activated
	▪ Operations personnel often exceed 500 per operational period and total personnel will usually exceed 1,000.
	▪ Branches need to be established
	▪ The Agency Administrator will have briefings, and ensure that the complexity analysis and delegation of authority are updated.
	▪ Use of resource advisors at the incident base is recommended
	▪ There is a high impact on the local jurisdiction, requiring additional staff for office administrative and support functions
	▪ Typically involve incidents of national significance.

6 Appendix C: Radio Cache Graphic

Capital Region Communications Steering Committee:
- 100 Portables - 800 MHz (20/locality)

NCR Cache:
- 500 Portables - 800 MHz

VSP Cache:
- 105 – VHF Radios (15/division - None at SPHQ)
- 43 VHF at SPHQ510 – UHF at SPHQ in Richmond
- 50 – 800 MHz STARS Radios at SPHQ in Richmond

VITA Cache:
- 15 UHF Portables

York & James City County Cache:
- 75 Portables - 800 MHz

Rockingham - Harrisonburg Cache:
- 25 Portables – UHF

Statewide Deployable:
- Fairfax (330 portables)
- Harrisonburg-Rockingham (300 portables)
- Chesapeake-Hampton (375 portables)

7 Appendix D: 800 MHz Trunked Radio Systems Graphic

800 MHz Trunked Radio Systems

- Shared M/A-COM
- M/A-COM
- Shared Motorola
- Motorola

* Cross Programming
** Currently on M/A-COM system, moving to Motorola
*** ORION – Motorola 700 MHz P25 overlay
**** York/James City County – Motorola 800 Motorola P25 (Gloucester County joining)

8 Appendix E: COMLINC Graphic

Legend:
- Capitol Region (Motobridge)
- Lynchburg/Roanoke (SyTech)
- Piedmont Valley (Cisco)
- Hampton Roads (ACU-1000)
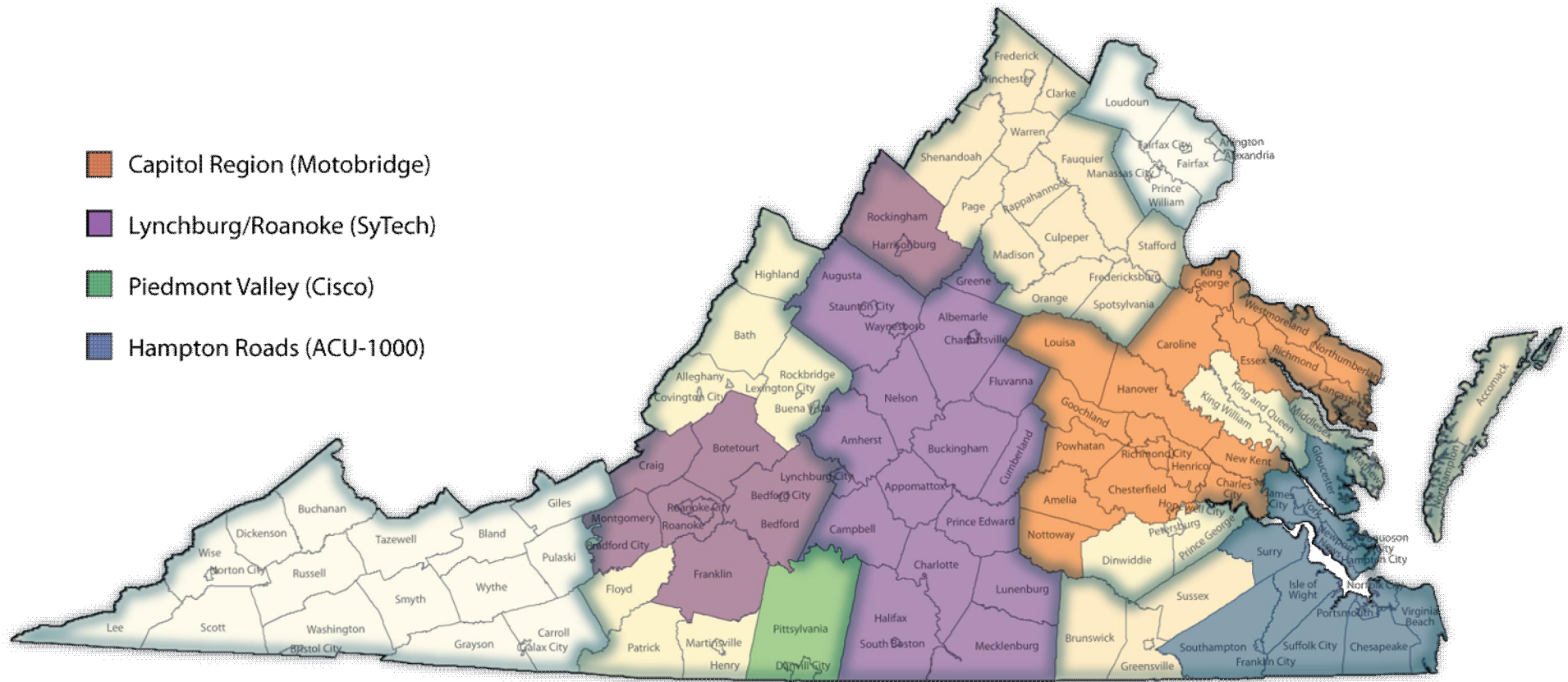
9 Appendix F: Acronym and Abbreviations Table

Acronym / Abbreviation	Meaning
AFIS	Automated Fingerprint Identification System
CAD	Computer Aided Dispatch
CAMEO	Computer-Aided Management of Emergency Operations
CapWIN	Capital Wireless Information Net
CICO	Commonwealth Interoperability Coordinator's Office
COG	Council of Governments
COMLINC	Commonwealth's Link to Interoperable Communications
DCJS	Department of Criminal Justice Services
DEH	Data Exchange Hub
ECC	Emergency Communications Center
EDACS	Enhanced Digital Access Communications System
EMMA	Emergency Management Mapping Application
EMNet	Emergency Management Network
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FMARS	Fire Mutual Aid Radio System
FRAC	First Responder Access Card
GETS/WPS	Government Emergency Telecommunications Service/Wireless Priority Service
GIS	Geographic Information Systems
HAZMAT	Hazardous Materials
HEAR	Hospital Emergency Administration Radio
HRTacRAN	Hampton Roads Tactical Regional Area Network
IAT	Initiative Action Team
IFLOWS	Integrated Flood Observing and Warning System
INET	Institutional Network
IP	Internet Protocol
IPICS	IP Interoperability and Collaboration System
LiNX	Law Enforcement Information Exchange

Acronym / Abbreviation	Meaning
MDT	Mobil Data Terminal
MHz	Megahertz
MOU	Memorandum of Understanding
NAWAS	National Warning System
NCR	National Capital Region
NIMS	National Incident Management System
NPSPAC	National Public Safety Planning Advisory Committee
OCP	Office of Commonwealth Preparedness
OEMS	Office of Emergency Medical Services
Ops Model	*Commonwealth of Virginia Operations Model*
ORION	Overlay Regional Interoperability Network
PIO	Public Information Officers
PMARS	Police Mutual Aid Radio System
PSAP	Public Safety Answering Point
PSIC	Public Safety Interoperability Communications
RHCC	Regional Healthcare Coordination Center
RIOS	Radio Inter Operability System
RPAC	Regional Preparedness Advisory Committees
RPAC-I	Regional Preparedness Advisory Committees for Interoperability
RTSMIS	Regional Transportation System Management Information System
SIEC	State Interoperability Executive Committee
SIRS	State Interdepartmental Radio System
SPHQ	State Police Headquarters
STARS	State Agencies Radio System
Statewide Plan	*2008 Commonwealth of Virginia Strategic Plan for Statewide Communications Interoperability*
SWAN	Statewide Alerting Network
Tech Plan	*Technical Plan for Statewide Interoperable Communications*
Tech Plan Blueprint	*2008 Commonwealth of Virginia Technical Plan Blueprint*
UASI	Urban Areas Security Initiative
UHF	Ultra High Frequency
VCIN	Virginia Criminal Information Network
VDEM	Virginia Department of Emergency Management

Acronym / Abbreviation	Meaning
VDFP	Virginia Department of Fire Programs
VDH	Virginia Department of Health
VDOT	Virginia Department of Transportation
VHA	Virginia Hospital Alliance
VHF	Very High Frequency
VHHA	Virginia Hospital & Healthcare Association
VITA	Virginia Information Technologies Agency
VJIC	Virtual Joint Information Center
VoIP	Voice over Internet Protocol
VSP	Virginia State Police
VTC	Video Teleconference
WMATA	Washington Metropolitan Area Transit Authority

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